



Nowra Bridge and Interchanges Urban Design Report and Landscape Character and Visual Impact Assessment

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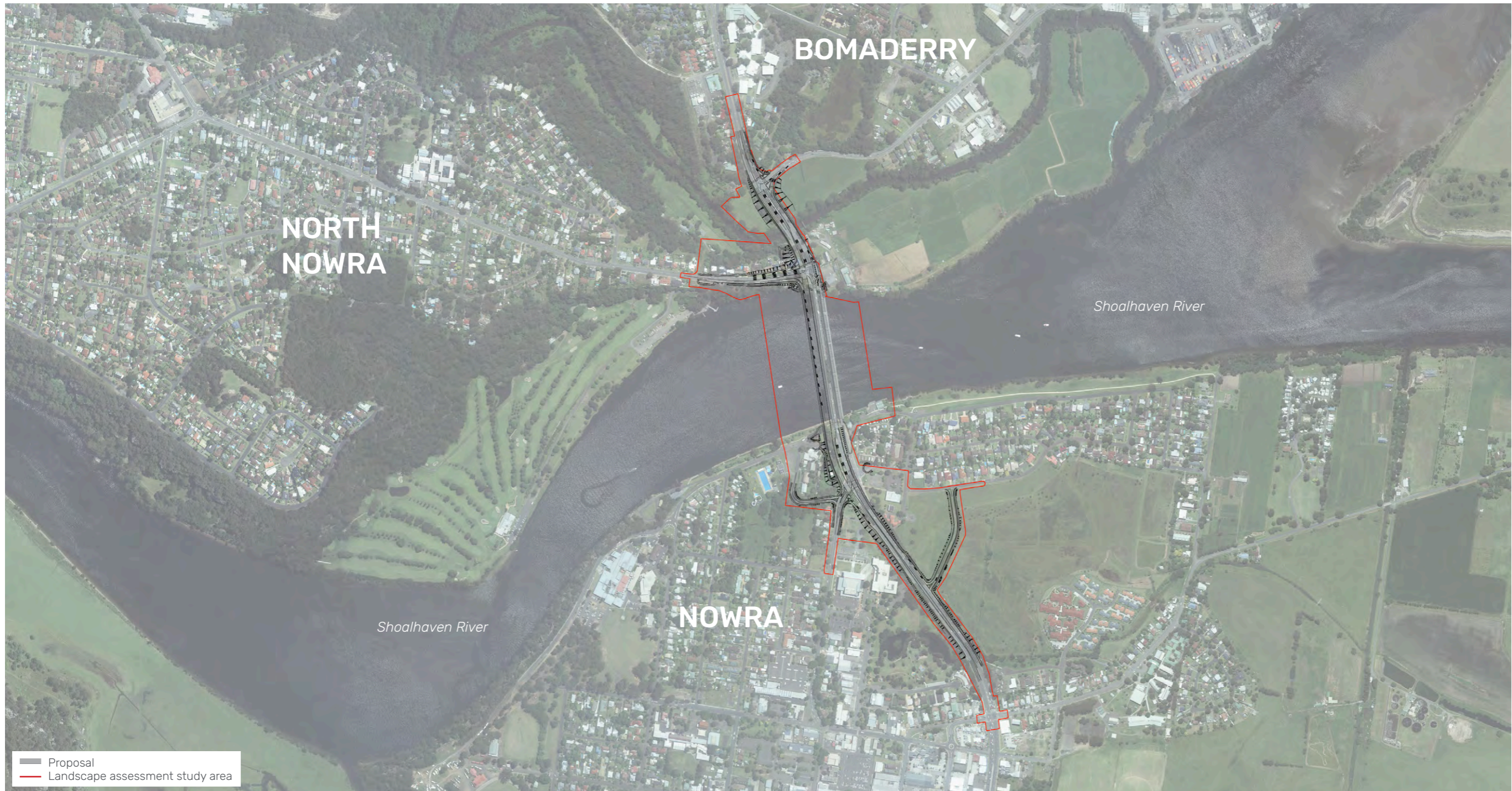


Figure 1. Aerial photograph of the proposal study area

Chapter 1

INTRODUCTION

1.1 BACKGROUND

The proposal is located at Nowra in the Shoalhaven local government area, around 160 kilometres south of Sydney on the NSW south coast. The A1 Princes Highway is the primary link from Sydney to the NSW South Coast via Nowra. The existing southbound bridge over the Shoalhaven River connects the neighbourhood of Nowra with North Nowra and Bomaderry (Figure 1). The existing heritage-listed steel truss bridge, which carries southbound traffic, is regarded as approaching the end of its functional life. The bridge cannot facilitate over height or over width freight as well as experiencing increased maintenance requirements and heightened traffic congestion. In response to these issues, Roads and Maritime Services (Roads and Maritime) is undertaking the upgrade of the crossing through the provision of an additional bridge over the Shoalhaven River, connecting Nowra with North Nowra, and Bomaderry. The proposal would also include the upgrade of about 1.6 kilometres of the Princes Highway in the vicinity of the new northbound bridge, as well as providing key intersection upgrades and modifications to the local road network. The proposal would improve access to Nowra and the surrounding areas, improve southbound access for large freight vehicles, and improve traffic flows.

A number of options were considered for the proposal including route options, network options, and bridge options. Based on the results of multiple options assessments, the preferred option for the Nowra Bridge Project proposes:

- A new river crossing upstream immediately to the west of the existing Princes Highway bridge crossings, providing three northbound lanes and a left turn lane to Illaroo Road, including a new shared use path, dedicated continuous slip lane between Bridge Road and Illaroo Road
- The existing northbound concrete bridge is to be reconfigured to carry southbound, non-pedestrian traffic, increasing the southbound through capacity from two to three lanes
- At-grade intersection upgrades at the intersections of Bolong Road and Illaroo Road, including provision for three northbound and southbound lanes on the Princes Highway through the river precinct
- The existing connection to Pleasant Way would be removed and an alternate local road connection provided further to the south
- The existing southbound bridge is to be retained and maintained for adaptive reuse, such as a pedestrian and cyclist path, but be closed to vehicular traffic (with the design and assessment of the adaptive reuse being addressed through a separate assessment).

The preferred option for the new northbound bridge form is a post-tensioned, concrete girder (incrementally launched) option (Roads and Maritime, 2018).

1.2 PURPOSE OF THIS REPORT

The overall purpose of this report is to describe the urban and landscape concept design for the new northbound bridge at Shoalhaven River, its relation to its context, and how the proposed solutions respond to the specific demands determined by the context and the community. The report includes a Landscape Character and Visual Impact Assessment that identifies the level of impact the proposal has on its environment and proposes further mitigation measures to be considered during detailed design. The concept design is guided by the *Environmental Impact Assessment Practice Note: Landscape Character and Visual Impact Assessment (EIA-NO4)* (Roads and Maritime, 2013).

1.3 PROPOSAL OBJECTIVES

The primary objectives of the proposal include:

- Reduce crash rates on the Princes Highway between Bolong Road and Bridge Road
- Support future traffic growth accessing the Princes Highway associated with planned land use in the Nowra Bomaderry area
- Provide southbound access for over height vehicles and HML freight on the Princes Highway across the Shoalhaven River
- Reduce delays and queuing on the Princes Highway between Bolong Road and Bridge Road
- Enable safe and efficient maintenance activities on the Shoalhaven River crossings without causing extended delays to the road network.

Roads and Maritime has also worked to achieve high quality proposal outcomes across customer service, time management, budget, environmental and work health and safety. These factors are fundamental to enable the design development, options evaluation and option selection for the proposal, and are reflected and described in Table 1.

Table 1. Secondary proposal objectives

| SECONDARY PROPOSAL OBJECTIVES | DESCRIPTION |
|---|---|
| Provide the best benefit to our customers | Nowra Bridge serves a wide variety of customers with a diverse set of requirements. The proposal is to investigate these requirements and identify a preferred option which provides the best balance and overall benefit to our customers, the community and stakeholders. |
| Delivering the proposal within an acceptable timeframe | To provide a proposal that can be completed within a short term timeframe. |
| Delivering the proposal within budget | To deliver a sustainable and innovative solution which achieves the proposal objectives and presents good value for money. |
| Prioritising the safety of our workers and our customers | The safety of our people and our customers is to be a priority during the planning, construction and operational phases. |
| Minimise environmental impact | To identify a proposal that best balances the overall environmental impact. |
| Deliver a proposal which fits sensitively with the built, natural and community environment | The existing southbound bridge is an important landmark within the local and regional context of Nowra and the south coast of NSW. Options were identified and developed appreciating its heritage significance and its role as the original bridge crossing of the Shoalhaven River. |

1.4 STRUCTURE OF THE REPORT

The report has been structured to clearly identify design responses and strategies and show compliance with the scope of work requirements.

Chapter 1: Introduction – Introduces the proposal, outlines the scope and provides a background of the work undertaken to date.

Chapter 2: Contextual Analysis – Provides a brief contextual analysis focusing on urban design relevant issues.

Chapter 3: Urban and Landscape Design Objectives, Key Principles and Strategy Plan – Identifies the design objectives, key principles for the proposal and presents the Strategy Plan.

Chapter 4: Urban and Landscape Concept Design – Presents the concept urban and landscape design including the design of the bridge.

Chapter 5: Landscape Character and Visual Impact Assessment.

Chapter 6: Conclusion.

This is followed by the References and Appendices.

1.5 DEFINITION OF THE PROPOSAL

The proposal is located at Nowra in the NSW south coast. The new northbound bridge is about 360 metres in length. It involves the construction of a new northbound bridge over the Shoalhaven River, associated approaches and intersection upgrades for Bolong Road, Illaroo Road and Bridge Road.

Key features of the proposal include:

- Construction of a new northbound bridge to the west (upstream) of the existing bridge crossings over the Shoalhaven River including:
 - Four northbound lanes including a dedicated left turn only lane from Bridge Road to Illaroo Road
 - A 3.5 metre wide shared use path on the western side of the bridge connecting the Illaroo Road intersection to the Bridge Road intersection.
- Widening of the existing bridge over Bomaderry Creek to the west (upstream)
- Minor lane adjustments on the existing northbound bridge to convert it to three lanes of southbound traffic
- Removal of vehicular traffic from the existing southbound bridge. Additional works would be provided under a separate project to convert the existing southbound bridge for adaptive reuse
- Upgrading of the Princes Highway to provide three northbound and three southbound lanes from Bolong Road through to about 75 metres north of Moss Street
- Widening of Illaroo Road over a distance of about 270 metres
- Upgrading of the Princes Highway and Illaroo Road intersection to provide:
 - Two southbound right turn lanes from the Princes Highway into Illaroo Road
 - Three dedicated right turn lanes and one dedicated left turn lane from Illaroo Road to the Princes Highway
 - Acceleration and merge lane for northbound traffic turning into Illaroo Rd from the Princes Highway.

- Upgrading of the Princes Highway and Bridge Road intersection to provide:
 - Two southbound right turn lanes from the Princes Highway into Bridge Road
 - One left turn lane from Bridge Road to the Princes Highway.
- Local road adjustments including:
 - Closing the access between Pleasant Way and the Princes Highway
 - Restricting turning movements at the intersection of Bridge Road and Scenic Drive
 - Construction of a new local road connecting Lyrebird Drive to the Princes Highway, about 300 metres south of the existing Pleasant Way intersection.
- Provision of pedestrian facilities at all intersections
- Dedicated off road shared use paths and footpaths along the length of the proposal
- Urban design and social amenity improvements, and landscaping including foreshore pedestrian links to the truss bridge
- Relocation and/or protection of utility services within the affected road corridor
- Drainage and water quality management infrastructure along the road corridor
- Property works including acquisition, demolition, and adjustments to access
- Temporary ancillary facilities during construction including site offices, construction compounds, and stockpile sites.

1.6 REFERENCE DOCUMENTS

The design is guided by the overarching best practice urban design principles as set out in *Beyond the Pavement: Urban Design Policy, Procedures and Design Principles* (Roads and Maritime, 2014). Further relevant urban design guideline documents include (Figure 2):

- Bridge Aesthetics, Roads and Maritime, July 2012
- Landscape Guidelines, Roads and Maritime, April 2008
- *Environmental Impact Assessment Practice Note: Guidelines for Landscape Character and Visual Impact Assessment ("EIA No4 Guidelines")*, Roads and Maritime, March 2013
- Guideline for Batter Surface Stabilisation using vegetation, Roads and Maritime, April 2015
- Biodiversity Guidelines - Protecting and Managing Biodiversity, RTA Sept 2011.



Figure 2. Roads and Maritime Design Guidelines
Source: Roads and Maritime

Chapter 2

CONTEXTUAL ANALYSIS

2.1 REGIONAL CONTEXT

The Shoalhaven and the South Coast District are popular tourist destinations in NSW due to its pristine coastal environment and natural bushland. Nowra, around 160 kilometres south of Sydney (Figure 3), is a major commercial centre within the Shoalhaven Local Government Area (LGA). It currently has a population of around 36,000 (Australian Bureau of Statistics, 2016) and is predicted to grow significantly by 2036 with an increasing role as a residential, employment and administration centre for the region.

The Shoalhaven River separates the town of Nowra from the urban areas of North Nowra and Bomaderry to the north. Access to these urban areas over the river is by the existing southbound heritage-listed bridge and the existing northbound concrete bridge. The crossing is a vital regional transport link in the NSW South Coast District, providing the only vehicle access over the Shoalhaven River. It is a key connection in the Sydney to Melbourne coastal corridor, as well as providing access to Canberra and the Southern Highlands.

Nowra is located within an area of highly scenic, natural bushland and pastoral landscape (Figure 5). There are a number of state forests and national park areas in the surrounding region that contain dense remnant vegetation. The key natural landmarks include the Illawarra Escarpment and Cambewarra Ranges (Figure 4) to the north, which contribute to the scenic quality, providing attractive views from the road corridors and urban areas. East of the bridge a large portion of land is used for agriculture, particularly dairy farming.

The Shoalhaven River rises in the eastern side of the Great Dividing Range and flows through natural and modified landscapes from west to east. Around 30 tributaries join the river before reaching the Pacific Ocean, about 15 kilometres east of Nowra Bridge.



Figure 3. Regional context



Figure 4. Cambewarra Ranges
Source: www.nationalparks.nsw.gov.au



Figure 5. Rural landscape
Source: www.springvalleyway.com

2.2 LOCAL CONTEXT

Nowra has a fragmented settlement structure. The proposal study area includes the urban areas of Nowra CBD in the south, and North Nowra and Bomaderry in the north. Beyond the urban areas of Nowra, the landscape is primarily natural bushland to the west and south, and pastoral land to the east. The Shoalhaven River as well as the Princes Highway separates the neighbourhoods. They are connected by the existing twin bridge crossings spanning over the Shoalhaven River. The twin bridges span 341 metres and are the only vehicle, pedestrian and cyclist connection across the 40 kilometre long river (Figure 8). The topography is relatively flat, with land gently sloping towards the Shoalhaven River (Figure 6). The characteristics and form of the three neighbourhoods that make up the area are summarised below.

NOWRA

The urban area of Nowra is laid out in a grid pattern of streets running in a roughly north-south and east-west direction (Figure 10). The built form is comprised of primarily single storey buildings (Figure 7) with a number of two and three storey buildings found within its commercial centre. Nowra CBD is the commercial and retail core for the area, serving Nowra, North Nowra and Bomaderry, as well as the wider region. The town is vehicle dominant, vehicular travel preferred over walking and cycling (Jackson Teece, 2015). The Princes Highway runs along the eastern side of Nowra central business district (CBD). Access into Nowra CBD for vehicles traveling south is primarily through Bridge Road, which intersects the Princes Highway immediately south of the existing southbound bridge. Numerous historic buildings illustrate the heritage of the town, while new buildings show Nowra as a regional centre within the Shoalhaven LGA. Open space is scarce, with Harry Sawkins Park and Marriot Park providing the only significant open space near the town centre. Outside of the town, large areas of pastoral land stretch east to the coast. To the west, the land is primarily natural bushland, consistent with the wider Nowra region. Foreshore open space, including Mavromattes Reserve, separates the built form of Nowra from the Shoalhaven River.



Figure 6. The Shoalhaven River separating Nowra (right) from North Nowra and Bomaderry (left)



Figure 7. Typical low-density housing of Nowra, North Nowra and Bomaderry
Source: www.google.com.au/maps



Figure 8. Existing southbound bridge - Heritage truss structure
Source: https://c1.staticflickr.com/5/4040/4621053538_910bc5ddec_b.jpg

NORTH NOWRA

North Nowra is a low to medium density residential suburb. The built form is primarily single and two storey residential buildings with a neighbourhood centre off Illaroo Road. North Nowra is characterised by its irregular street layout (Figure 10). The streets are wide with established vegetation and views to the surrounding landscape. Many of the residential streets are cul-de-sacs, with Illaroo Road the main arterial road through the area and the only connection to the Princes Highway immediately north of the existing northbound bridge. The neighbourhood is separated from the river by open space including Nowra Golf Club and Rotary Park. Bomaderry Creek and its associated open space, including Bomaderry Creek Regional Park to the north, separate North Nowra and the neighbourhood of Bomaderry.

BOMADERRY

The Princes Highway runs along the western edge of Bomaderry. The neighbourhood's multiple connections to the highway and close proximity to Bomaderry Railway Station, facilitate a range of land uses including residential, industrial, commercial and retail. An area of agricultural land sits between Bolong Road and the Shoalhaven River, separating the neighbourhood from the river. A neighbourhood centre is located on Meroo Street near Bomaderry Railway Station. The street network south of Cambewarra Road is laid out in a regular grid pattern, while north of Cambewarra Road the streets take on a more irregular street pattern similar to North Nowra. The land east of Bomaderry is primarily pastoral land stretching as far as Shoalhaven Heads at the coast.

Local destinations close to the proposal include Nowra Golf Club, TAFE Illawarra, Shoalhaven Visitors Centre, East Willows Van Park, and Nowra Aquatic Park (Figure 9). Additional land uses include the vacant Riverhaven Motel and Bomaderry Railway Station.



Figure 9. Nowra Aquatic Park
Source: www.google.com.au/maps

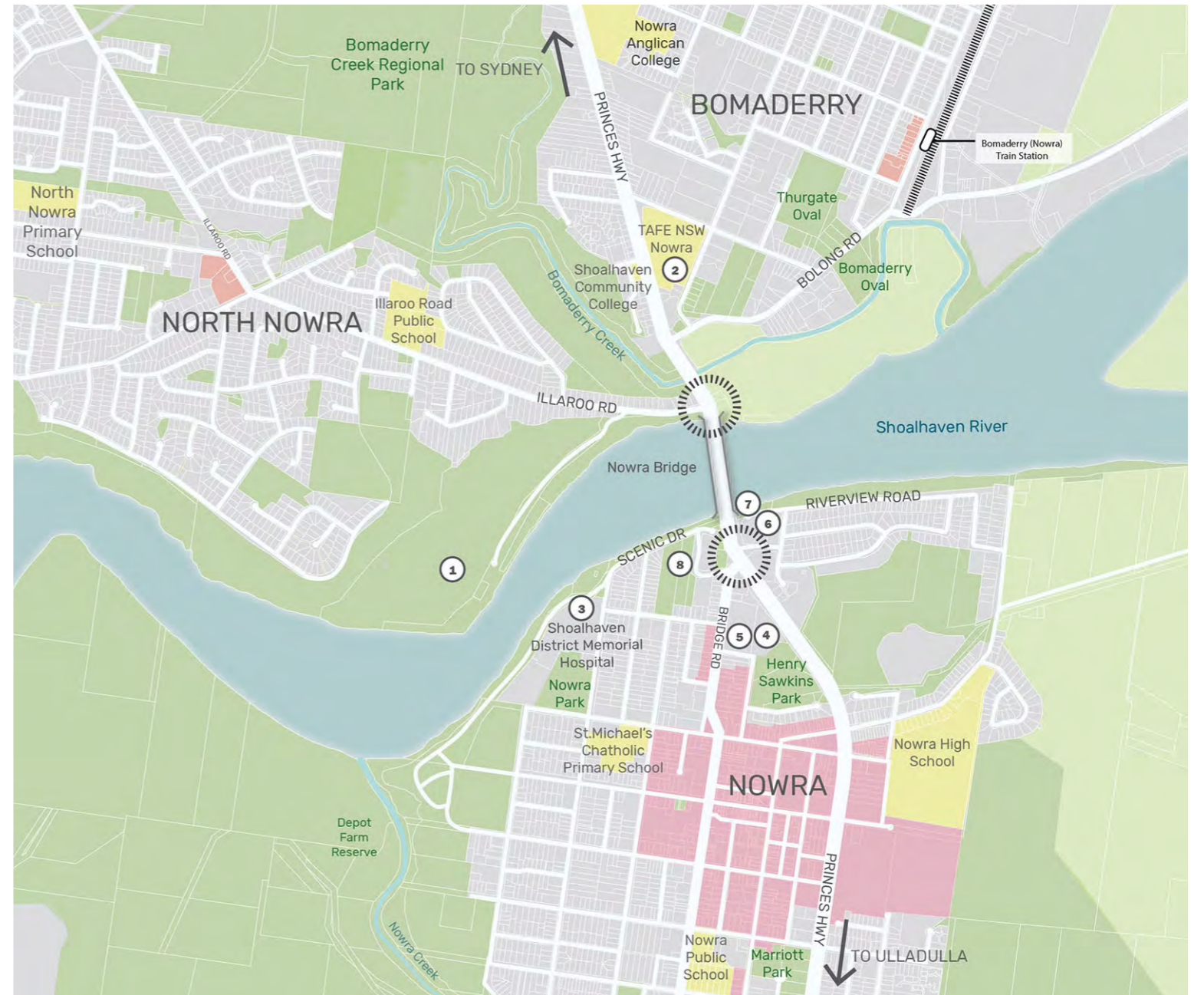


Figure 10. Local context



2.3 LAND USES AND COMMUNITY

The urban areas of Nowra, Bomaderry and North Nowra are surrounded by highly scenic natural and modified land. The extensive areas of open space contain natural remnant vegetation, particularly to the west of Nowra Bridge and along the creek lines. To the east, there are large areas of agricultural land along the riverfront and surrounding the urban areas of Nowra and Bomaderry (Figure 14).

Nowra is the primary retail and commercial centre of the local study area. The land uses surrounding the commercial centre are largely mixed-use and low-density residential with single and two storey detached housing (Figure 11).

Nowra interfaces with the Shoalhaven River through continuous open space along the foreshore (Figure 12). The open space provides opportunities for passive and active recreation including walking, cycling, children's play and picnicking. A caravan park, aquatic park and restaurants are located nearby.

The urban areas of Bomaderry and North Nowra on the northern side of the Shoalhaven River are separated from the waterfront by agricultural land or open space including Nowra Golf Course (Figure 13). North Nowra is a largely low-density residential area with a small retail centre serving the local community.

The Princes Highway as well as Bomaderry Creek and its associated open space separate Bomaderry from North Nowra. The land uses within Bomaderry, similar to that of North Nowra, are primarily low-density residential with a small local retail area. In addition, Bomaderry has a large proportion of land used for industrial and agricultural purposes as well rail infrastructure, including the Bomaderry Railway Station.

Design considerations:

- Develop landscape design strategies that enhance and complement existing land uses
- Maintain access and connections to key land uses
- Consider visual, noise and character impact of nearby land uses in developing the design.



Figure 11. Typical residential dwelling of Nowra



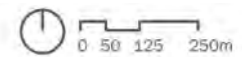
Figure 12. Shoalhaven River foreshore open space from the existing northbound bridge looking southwest (upstream)



Figure 13. Aerial view of Nowra Golf Course looking east



Figure 14. Land use



2.4 TRANSPORT AND CONNECTIVITY

ROAD NETWORK

As a major centre of the NSW South Coast and the only crossing point on the Shoalhaven River, Nowra has a number of primary regional transport connections. The Princes Highway (A1) is the major north-south spine for the region, connecting Sydney to towns along the South Coast including Ulladulla, Batemans Bay and eventually Melbourne. Primary traffic routes from Shoalhaven Heads and the Southern Highlands join the Princes Highway through Bolong Road and Moss Vale Road north of the river, while Albatross Road south of Nowra CBD connects Canberra and the Snowy Mountains. Illaroo Road connects North Nowra to the Princes Highway, while Nowra CBD is accessed through Bridge Road.

PUBLIC TRANSPORT

Public transport to and within the Nowra region includes rail and bus services. The South Coast railway line connects Sydney to regional South Coast towns, terminating at Bomaderry Railway Station (Figure 16). There are 16 services leaving for Sydney and 18 arriving every weekday (Shoalhaven City Council, 2011). There are also regional and local buses serving the area. Regional buses stop at Stewart Place in Nowra and Bomaderry Railway Station. Local buses serve the urban areas of Nowra, Bomaderry and North Nowra.

PEDESTRIAN AND CYCLISTS

Recreational cycle routes around Nowra connect to landscape features including the Shoalhaven River and areas of public open space. Within the study area there are a number of shared use paths including a cantilevered shared use path over the existing southbound bridge (Figure 15), separate to the truss structure and a separated shared use path along the concrete bridge. There are shared use paths along the southern foreshore in Nowra and along Illaroo Road in North Nowra and Bolong Road in Bomaderry (Figure 17). There is an absence, however, of on-road cycle paths with the only section close to the proposal being along the Princes Highway north of Bolong Road. The Shoalhaven Bicycle Plan (2013) promotes a number of shared and on-road cycle paths to connect to the existing paths, although few have been implemented to date (Figure 19).

Design considerations:

- Provide clear identification/gateway of entry to Nowra CBD from Bridge Road
- Improve active transport connections throughout the proposal area
- Provide safe and easy pedestrian and cycle connections along and across the proposal to ensure connectivity is maintained and strengthened.



Figure 15. Shared path attached to heritage truss bridge



Figure 16. Bomaderry Railway Station

Source: https://en.wikipedia.org/wiki/Bomaderry_railway_station#/media/File:Bomaderry_railway_station.jpg



Figure 17. Shared path beneath the existing bridge structures on the southern foreshore



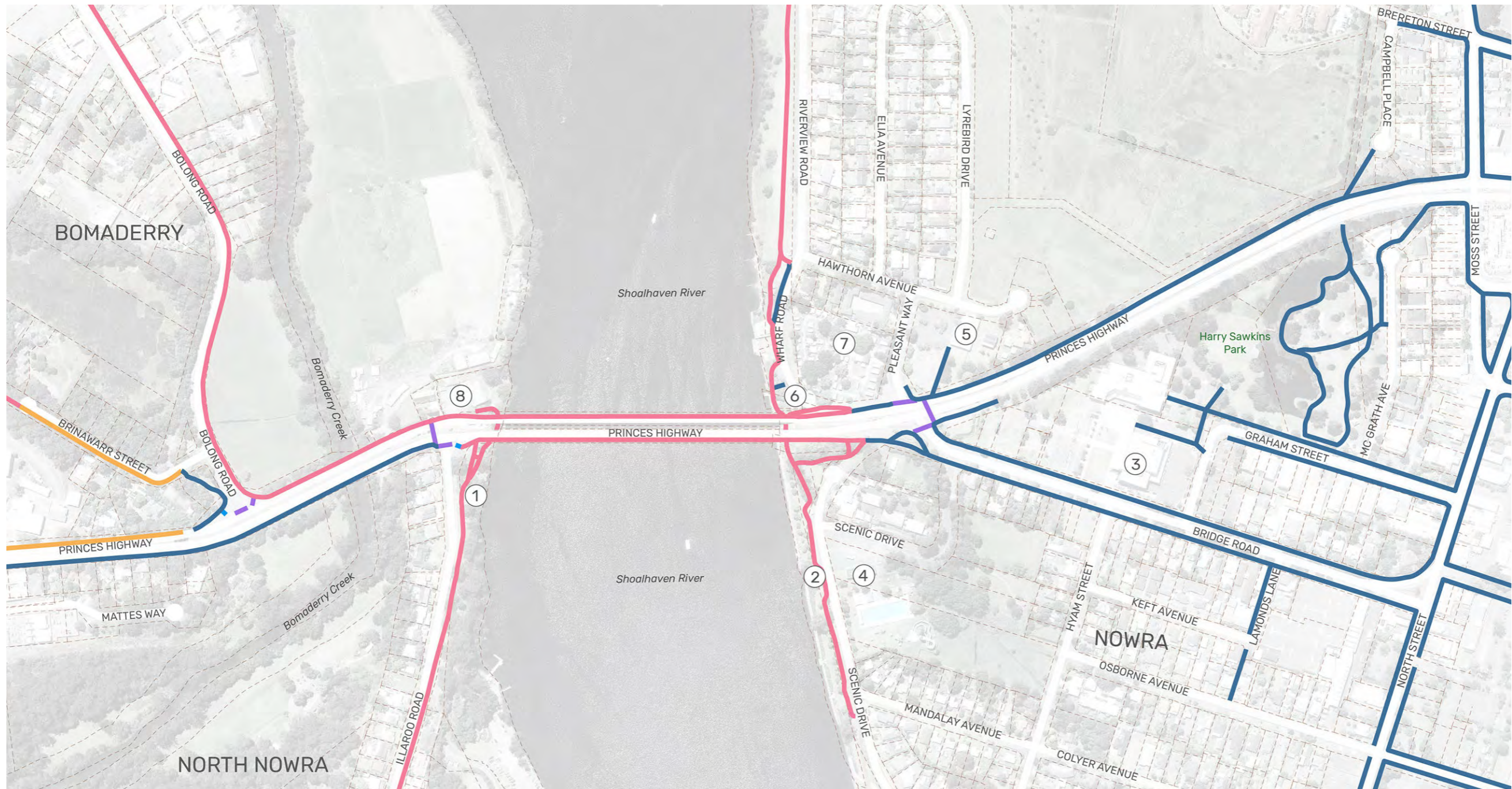


Figure 19. Connectivity analysis

- | | |
|---|---|
| <p>KEY</p> <ul style="list-style-type: none"> — Shared path — Footpath — On-road cycleway — Signalised crossing — Pedestrian crossing | <p>Destination land uses</p> <ul style="list-style-type: none"> ① Rotary Park ② Bens Walk foreshore open space ③ Shoalhaven Entertainment Centre ④ Nowra Aquatic Park ⑤ Nowra Steakhouse & Cafe ⑥ Wharf Rd Restaurant & Bar ⑦ Easts Willows Van Park ⑧ Perfect Catch Seafoods & Takeaway |
|---|---|



2.5 LANDFORM, HYDROLOGY AND KEY VIEWS

The proposal area is located at the southern end of the Sydney Basin, within the Shoalhaven coastal floodplain. The steep sandstone cliffs of the Illawarra Escarpment and Cambewarra Range flatten to become a floodplain to the east. The landform within the floodplain slopes gently towards the Shoalhaven River. The topography of the proposal area reflects this, with primarily flat land that gently slopes towards the river. The hydrology of the area is dominated by the Shoalhaven River, into which flow a number of tributaries including Bomaderry Creek and Nowra Creek. The area is subject to widespread flooding. The flood planning area is depicted in Figure 20.

The views of the area are largely dictated by the topography of the region. With the proposal area situated within an alluvial floodplain; there are impressive views to the wide, sweeping Shoalhaven River and vegetated banks. The Shoalhaven River and the area to the northwest are considered Scenic Protection Areas under the Shoalhaven LEP 2014 (Figure 20). The steel structure of the historic bridge crossing is a highly visible element from the Princes Highway on approach from the north and south, as well as from the river and foreshore.

Outside the urban areas of Nowra and Bomaderry there are open scenic views of flat and rolling pastoral land with scattered trees. To the west and northwest there are distant views of the Illawarra Escarpment and Cambewarra Mountain Range.

Design considerations:

- Design of earthworks and embankments to integrate into the existing natural topography, as far as possible, to create a seamless fit with the existing setting
- Consider opportunities to enhance the driver experience with strategic views into the surrounding landscape, fostering a sense of place and local connection
- Integrate the proposal sensitively into the hydrological patterns of the Bomaderry and Nowra Creeks and their catchment areas
- Design structures to enhance, complement and add to the scenic qualities of the surrounding landscape.

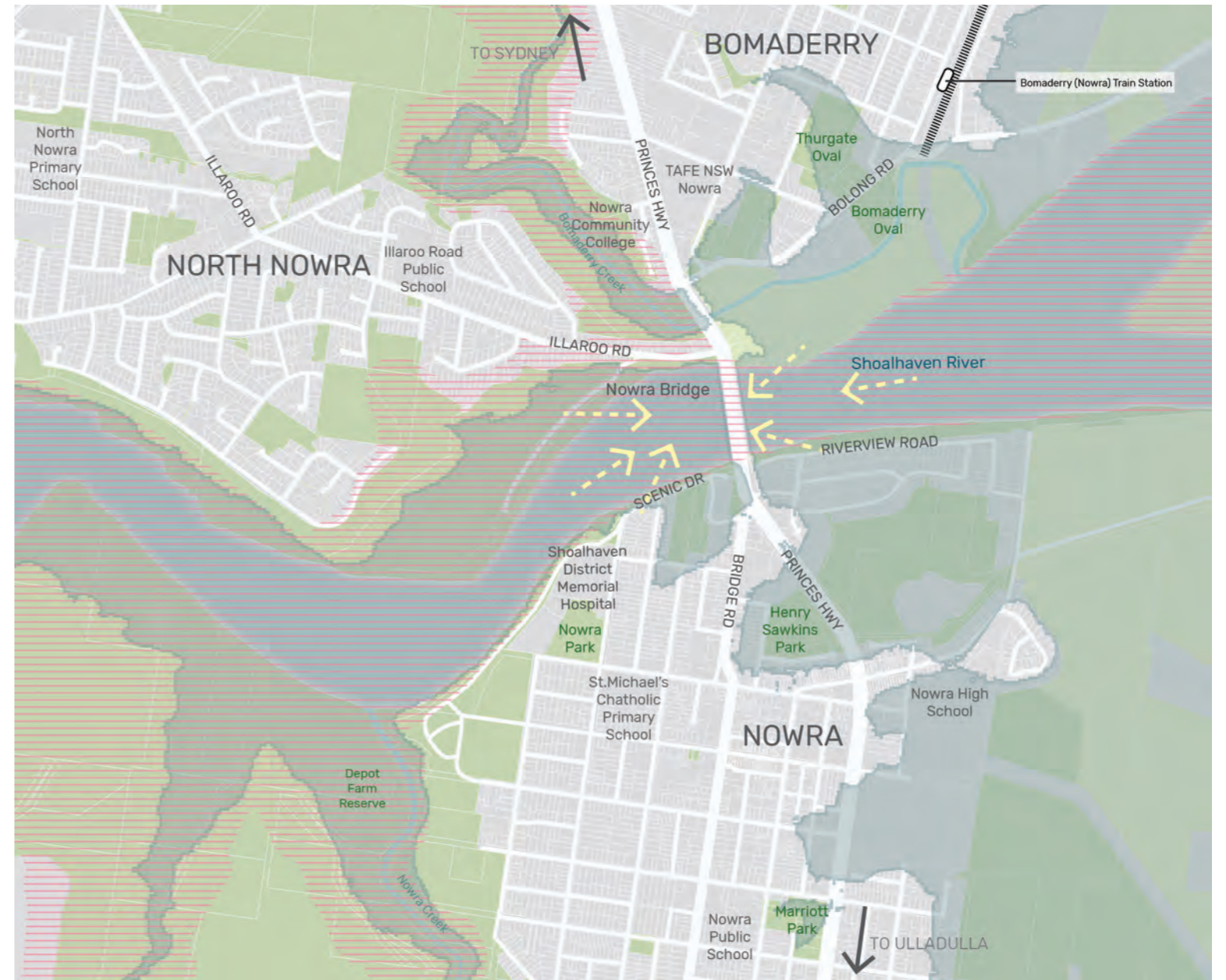


Figure 20. Scenic protection, flood planning area, and key views



2.6 THE SHOALHAVEN RIVER

The Shoalhaven River is the defining landscape feature for the area and the reasoning behind settlement in this location. It has a distinctive character that is defined by its wide sweeping form cutting through the alluvial floodplain. The flat topography of the area reinforces the river as a visual landmark (Figure 21).

The river's edge has a natural scenic quality with some modified areas close to the existing northbound and southbound bridges (Figure 22). These include sandstone retaining walls and grassed sloping levee banks particularly on the south side of the bridge. Wharf Road Restaurant and Bar is close to the river's edge and in prominent view from the bridge. A number of small timber wharfs are dotted along the sandstone wall on the southwestern side of the bridge.

There are extensive areas of natural vegetation along the northwest side of the bridge and further east and west along of the river. The development of the riverfront on the northern side of the river appears to be limited due to the steep riverbank.

The existing northbound and southbound bridges, as the only structures that cross the river in the locality, have a landmark quality that is emphasised by the exposed and prominent visual character of the river and its natural landscape setting (Figure 23).



Figure 21. The Shoalhaven River from North Nowra looking east



Figure 22. The southern river foreshore looking east



Figure 23. Aerial view of the Shoalhaven River and the existing southbound and northbound bridges looking northwest

2.7 HERITAGE

ABORIGINAL HERITAGE

Aboriginal heritage in the region dates back over 20,000 years. The primary Aboriginal groups occupying the local area are thought to have been the Wandandian and the Murramarang, who were a part of the Dhurga language group. The Dhurga language was spoken in the Shoalhaven area and south to Narooma. Despite the disenfranchisement resulting from European occupation, Aboriginal culture remains strong today. The study area falls within the boundaries of the Nowra Local Aboriginal Land Council (NLALC) (Artefact, 2015).

NON-ABORIGINAL HERITAGE

European settlement occurred in this area early in the 19th century, driven by cedar logging along the watercourses. Development on the northern and southern banks of the Shoalhaven River was a result of ease of access. The northern banks of the river at Bomaderry settled quickly. The village of Nowra was laid out by Surveyor Thomas Mann in 1852 and grew in population as a result of two major floods affecting settlements near the Shoalhaven River, as well as the discovery of gold in 1872. There are a number of items in the study area of local and state heritage significance. The two state heritage items closest to the Nowra Bridge are Bomaderry Aboriginal Children's Home and Graham Lodge in Nowra (Figure 24).

The existing southbound bridge, built in 1881, is listed on the RMS s.170 Heritage and Local Government Register (Figure 25). It is considered a rare, surviving example of a pre-1890s "American-style" Whipple Truss bridge and an item of historic, aesthetic, social and technical significance (Jackson Teece, 2015). It was designed by an American specialist bridge engineer, C. Shaler Smith, and built with iron and steel to carry a double railway track, which never extended beyond Bomaderry Station. Although the rail line did not extend past Bomaderry, the construction of the bridge to carry traffic across the river contributed greatly to the development of the NSW South Coast. The construction of a second concrete bridge (northbound), adjacent to the existing southbound heritage bridge, occurred in early 1980. An assessment of impacts on historical heritage has been prepared for the proposal.



Figure 24. Graham Lodge
Source: www.shoalhaven.nsw.gov.au



Figure 25. Existing heritage truss bridge
Source: http://scourbrittfamily.files.wordpress.com/201302nowra

- KEY**
Heritage item
- NON ABORIGINAL HERITAGE ITEMS**
- (A) Lynburn Timber Federation Residence
 - (B) Bomaderry Aboriginal Children's Home (state heritage)
 - (C) Federation Queen Anne style Residence
 - (D) Federation brick and asbestos tile residence
 - (E) "Illowra"—Federation timber Berry Estate residence and garden
 - (F) "Shoalhaven River Bridge"—Victorian wrought iron bridge
 - (G) Inter-war Weatherboard Building and Timber Wharf
 - (H) Graham Lodge (former Greenhills Estate Homestead) and grounds (state heritage)
 - (I) Former Numbaa red cedar flood boat and Captain Cook Bicentennial Memorial
 - (J) Ben's Walk including Suspension Bridge and Aboriginal Art Sites

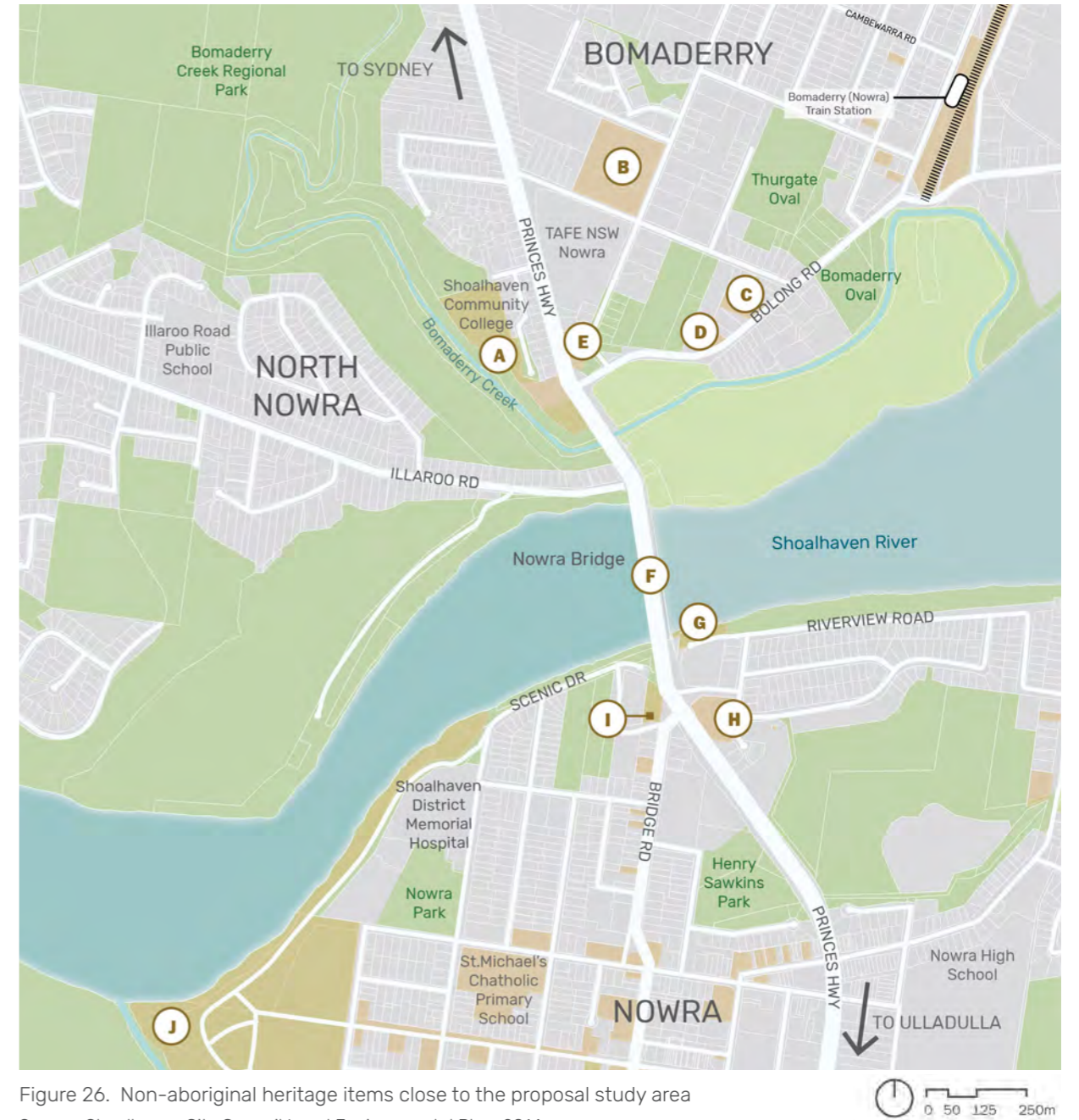


Figure 26. Non-aboriginal heritage items close to the proposal study area
Source: Shoalhaven City Council Local Environmental Plan, 2014

2.8 EXISTING BRIDGE CROSSING

A key feature of the experience in the Nowra region is its relationship with the Shoalhaven River (Figure 28 and 29). The existing southbound and northbound bridges crossing the river are key landmarks to the urban areas of Nowra, North Nowra and Bomaderry form a major element in the identity of the area (Figure 30). They have contributed significantly to the social and commercial development of Nowra as well as the NSW South Coast District. The river crossing at Nowra is currently the only pedestrian, cycle or vehicular crossing point within the Shoalhaven LGA. The crossing consists of two bridge elements; one southbound truss structure constructed in 1881 and the subsequent northbound structure in 1980 to accommodate increased traffic volumes. Prior to the construction of the existing southbound truss bridge a ferry carried the public across the river.

The existing southbound truss bridge is about 342 metres in length. It currently carries the southbound traffic across the river and into the town of Nowra and is a dominant element in the visual experience on entering the town (Figure 27). Due to increased congestion either side of the river, forecast traffic volumes and the impact associated with temporary maintenance closures, the construction of a new northbound bridge has been proposed.



Figure 28. View from the existing southbound bridge looking east



Figure 27. View for traffic travelling over the existing southbound bridge



Figure 29. View from the existing northbound bridge looking west



Figure 30. View of the existing southbound truss structure from the southern foreshore in Nowra

Source: http://www.rc.au.net/photos20140126_204-Edit-1920.jpg

2.9 FLORA AND FAUNA

The study area is predominantly cleared of native vegetation; terrestrial habitats have been modified by past and current infrastructure, however there is a small stand of bushland located on the north-western bank forming part of the boat ramp and Rotary Park.

The remaining bushland contains substantial fauna habitat features including several large sandstone overhangs. The study area is located immediately south of Bomaderry Creek, which connects to Bomaderry Creek Regional Park. This corridor is known to host a number of threatened biota including Yellow-bellied Glider, Powerful Owl and Gang-gang Cockatoo. The Shoalhaven River provides a variety of habitat including mud flats, seagrass, mangroves, and estuarine, many of which may be used by threatened species.

Vegetation in the landscape is extensive to moderately cleared tall open-forest. Two native vegetation communities exist in the proposal area, that being Spotted Gum - Blackbutt shrubby open forest on the coastal foothills, southern Sydney Basin Bioregion and northern South-East Corner Bioregion and Swamp Paperbark - Swamp Oak tall shrubland on estuarine flats, Sydney Basin Bioregion and South-East Corner Bioregion. In addition, several mixed native and exotic vegetation communities exist throughout the study area.

The canopy of the Spotted Gum - Blackbutt shrubby open forest only consists of *Corymbia maculata*, and has a varied, shrubby midstorey dominated by *Bursaria spinosa* subsp. *spinosa*, *Backhousia myrtifolia*, *Pittosporum undulatum* and *Prostanthera incana*. Groundcovers species include mix of grasses and forbs such as *Themeda triandra*, *Entolasia stricta*, *Epidendrum* sp, *Bryophyllum delagoense* and *Chlorophytum comosum*. Also identified was a diversity of climbers including *Smilax australis*, *Pandorea pandorana* and *Glycine clandestina*. The majority of this community was mapped within the study area as in a moderate condition with a partially disturbed understorey.

The Swamp Paperbark-Swamp Oak tall shrubland community is predominantly a canopy of Swamp Oak (*Casuarina glauca*) with occasional remnant mature Eucalypts such as Bangalay (*Eucalyptus botryoides*) present. The ground cover is highly disturbed and supported mainly exotic grasses and herbaceous perennials. Large flowering Eucalyptus species such as Bangalay provide high quality seasonal foraging opportunities for nectar feeding fauna. Swamp Oak provides a season foraging resource for seed dependent birds and arboreal mammals.

Planted Mixed Native areas have a managed turf groundcover of mostly *Kikuyu*, *Pennisetum clandestinum*, with planted native and exotic trees as specimens or avenues. Commonly occurring trees include *Eucalyptus microcorys*, *Eucalyptus saligna* x *botryoides*, *Casuarina cunninghamiana*, *Ficus macrocarpa*, *Corymbia maculata*, *Jacaranda mimosifolia*, *Populus nigra* 'italica' and *Platanus x acerifolia*.

Garden plants and landscaped areas also include Hibiscus cultivars, *Lomandra longifolia*, Grevillea cultivars and Callistemon cultivars.



Figure 31. Vegetation in Rotary Park on the bank of the Shoalhaven River in North Nowra



Figure 32. Woodland planting along the Princes Highway looking south



Figure 33. Cleared agricultural land and dense vegetation close to the road edge along Bolong Road looking west toward the Princes Highway

2.10 LANDSCAPE CHARACTER ZONES

The landform and vegetation, views and vistas, settlement patterns and built structures within and adjoining the proposal combine to define the landscape character of the study area. The landscape character defines a set of visual values associated with areas that shape the experience of both motorists and viewers in surrounding areas. As can be expected, there are a number of different Landscape Character Zones (LCZs) within the study area. They are identified in Figure 34 and are listed and described below:

- LCZ 1 – Rural/Regional Park
- LCZ 2 – Illaroo Road Residential
- LCZ 3 – Shoalhaven River Waterbody
- LCZ 4 – River Foreshore – South
- LCZ 5 – Nowra Town Entry
- LCZ 6 – Nowra Multi-use.

The Landscape Character Zones influence the design response and the level of mitigation required. The following section outlines the key attributes of each character zone.

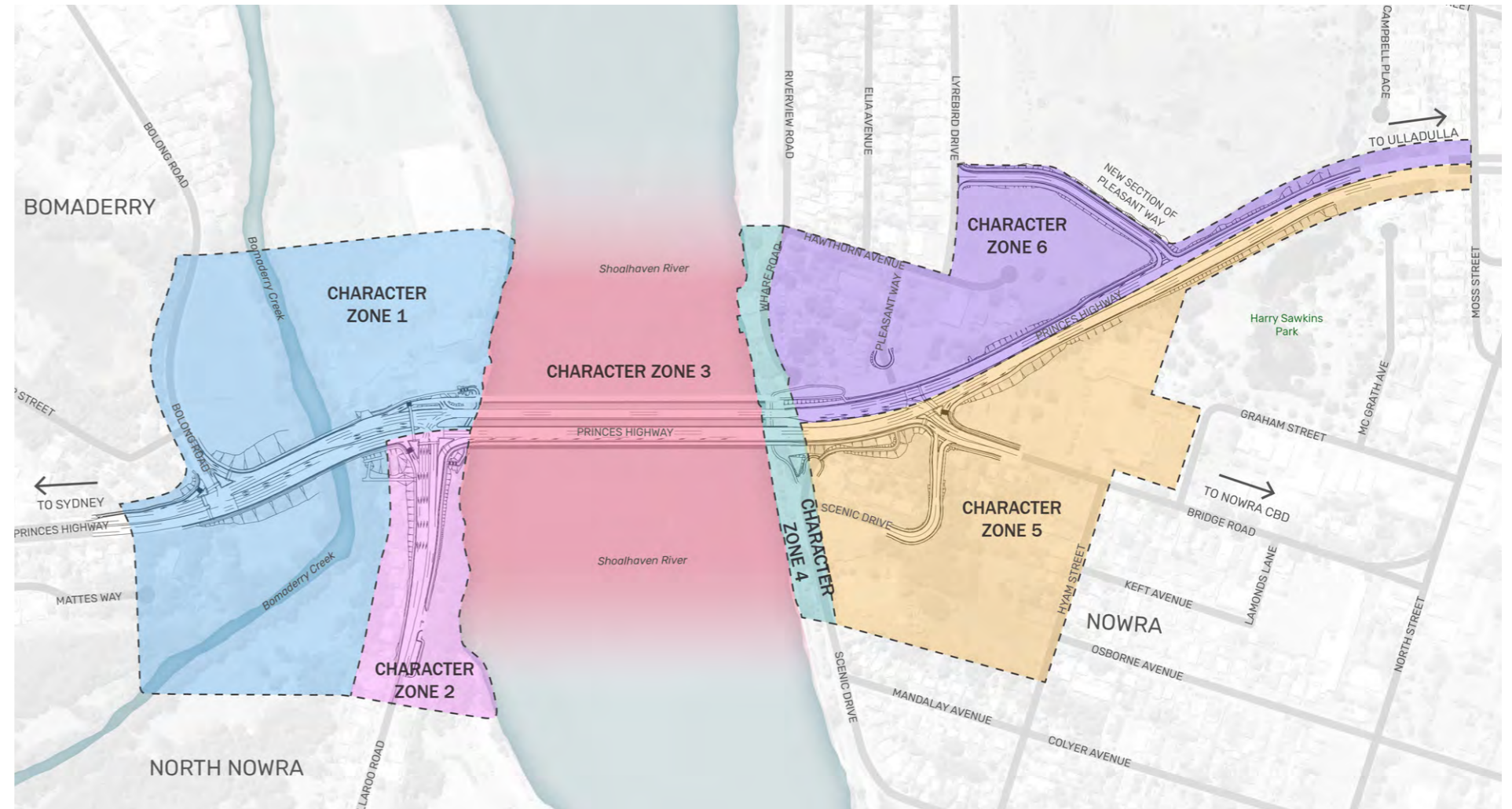


Figure 34. Character Zones

| KEY | |
|---------------------------------------|--|
| ■ | Character Zone 1 – Rural/Regional Park |
| ■ | Character Zone 2 – Illaroo Road residential |
| ■ | Character Zone 3 – Shoalhaven River waterbody |
| ■ | Character Zone 4 – Riverfront open space – south |
| ■ | Character Zone 5 – Nowra town entry |
| ■ | Character Zone 6 – Nowra multi-use |



2.10.1 LANDSCAPE CHARACTER ZONE 1 – RURAL/ REGIONAL PARK

This character zone includes the areas east of the Princes Highway between the Shoalhaven River and Bolong Road, and Bomaderry Creek and its associated vegetated corridor west of the Princes Highway. Bomaderry Creek runs through the centre of the zone.

Adjacent to the Princes Highway at the eastern side of Nowra Bridge, there is a seafood restaurant and takeaway and a number of buildings to the north associated with the agricultural land between Bomaderry Creek and Shoalhaven River (Figure 35). There is an additional area of rural land between Bomaderry Creek and Bolong Road. To the west of the Princes Highway, Bomaderry Creek continues northeast towards Bomaderry Regional Park. The area is densely vegetated with mature trees and includes the Bomaderry Creek Walking Track used by tourists and locals.

2.10.2 LANDSCAPE CHARACTER ZONE 2 – ILLAROO ROAD RESIDENTIAL

LCZ 2 is located north of the Shoalhaven River and immediately west of the Princes Highway. The character zone is characterised by a single row of residential dwellings on the northern side of Illaroo Road, separated from the riverfront by Rotary Park (Figure 35). The residential dwellings back onto Bomaderry Creek and its associated vegetated corridor. The topography descends with Illaroo Road towards the Princes Highway. There is a sharp drop off from Rotary Park to the river exposing a cliff face. Rotary Park is highly visible from the southern bank of the river and while crossing the existing northbound bridge. There is a walkway beneath both bridge structures, which connects to the eastern side of the bridge. Mature vegetation throughout the park screens the road and the properties on Illaroo Road from view.



Figure 35. Agricultural land east of the Princes Highway near Bolong Road – looking east



Figure 36. Single and two storey residential dwellings along Illaroo Road

2.10.3 LANDSCAPE CHARACTER ZONE 3 – SHOALHAVEN RIVER WATERBODY

The Shoalhaven River is the predominant visual element in the landscape with a distinctive character that is defined by its wide sweeping form cutting through the low-lying topography. It has a scenic character that is a combination of the horizontal water plane; the rivers edge vegetation and distant views to the hills and ranges beyond (Figure 37). The river is included as a 'Scenic Protection Area' in the Shoalhaven LEP 2014.

The experience crossing the river varies depending on the direction of travel. Southbound traffic currently crosses the heritage listed Whipple truss bridge that partially obstructs the surrounding views to the landscape, including views east towards Mount Coolangatta. The northbound traffic, however, has uninterrupted views from the existing concrete bridge to the west and to the north towards the Illawarra Escarpment and Cambewarra Ranges.

2.10.4 LANDSCAPE CHARACTER ZONE 4 – RIVER FORESHORE - SOUTH

LCZ 4 covers the open space that runs along the southern river foreshore (Figure 38). These areas of open space stretch along the Shoalhaven riverfront and offer a highly scenic and tranquil setting. The landform is generally flat, sloping gradually towards the water's edge and open lawn areas and clusters of mature trees dominate the character. The riverfront open space is adjoined by the open space in LCZ 5, which fronts the vacant Riverhaven Motel along the western side of the Princes Highway. The clusters of vegetation on the western side of the bridge contribute significantly to the scenic and natural quality of the character zone, as well as providing key visual queues for traffic approaching the bridge from the south.

Visitors and locals utilise the open space areas along the river foreshore for walking and cycling and passive and active recreation. Bens Walk, an east-west pedestrian and cycle path stretches the length of the character zone, passing beneath both existing bridge structures. Wharf Road Restaurant and Bar, as well as Shoalhaven River Cruise and a wakeboarding school are located immediately east of the bridge. Nowra Sailing Club was also located east of the bridge prior to burning down in June 2017. The sailing club continues to operate in this vicinity.



Figure 37. View of Shoalhaven River from Nowra Bridge looking west (upstream)



Figure 38. Shoalhaven River southern foreshore from Nowra Bridge looking southeast

2.10.5 LANDSCAPE CHARACTER ZONE 5 – NOWRA TOWN ENTRY

Situated at the southern end of the proposal, LCZ 5 is defined by Scenic Drive to the north and Hyam Street to the south, with the character zone extending south along the Princes Highway to Moss Street. Access to the town comes from either Bridge Road through the centre of the character zone or from the Princes Highway.

The buildings within LCZ 5 are mostly a mix of single and two storeys and the topography is relatively flat with land sloping gently towards the river. This zone is primarily comprised of commercial uses with a number of residential uses distributed throughout. To the southeast, the commercial edge of Nowra CBD, including Nowra Entertainment Centre and the Shoalhaven City Council building (Figure 39), can be found in the narrowing block between Bridge Road and the Princes Highway and indicate the entry to Nowra CBD. Closer to the Shoalhaven River there are more tourist orientated commercial uses. The former Riverhaven Motel building and Waterways Swim School are set back from the Princes Highway, with Nowra Aquatic Park beyond. An area of open space with mature trees provides a buffer between the motel and the Princes Highway. This area of open space adjoins the foreshore open space and Ben's Walk. There is also a large area of open space between the Aquatic Park and Hyam Street.

2.10.6 LANDSCAPE CHARACTER ZONE 6 – NOWRA MULTI-USE

LCZ 6 lies east of the Princes Highway and is defined by Wharf Road to the north and Hawthorn Road to the east. LCZ 6 also extends south along the Princes Highway as far as Moss Street. The zone has primarily commercial and tourist uses with Nowra Steakhouse and Café to the south and East Willows Van Park and Pleasant Way River Lodge to the north (Figure 40). East Willows Van Park provides campgrounds and caravan accommodation to tourists. The campgrounds have scattered trees throughout. There is a residential area to the east of the character zone, with primarily rural land to the south. A car park fronts the restaurant and cafe along Pleasant Way.



Figure 39. Shoalhaven City Council (left) and Shoalhaven Entertainment Centre (right)



Figure 40. East Willows Van Park from the Princes Highway

Chapter 3

URBAN DESIGN AND LANDSCAPE OBJECTIVES AND PRINCIPLES

3.1 OVERALL PROPOSAL OBJECTIVES

The overall proposal objectives outlined in the Review of Environmental Factors (2018) are:

- Reduce crash rates on the Princes Highway between Bolong Road and Bridge Road
- Support future traffic growth accessing the Princes Highway associated with planned land use in the Nowra Bomaderry area
- Provide southbound access for over height vehicles and HML freight on the Princes Highway across the Shoalhaven River
- Reduce delays and queuing on the Princes Highway between Bolong Road and Bridge Road
- Enable safe and efficient maintenance activities on the Shoalhaven River crossings without causing extended delays to the road network.

These overall proposal objectives have influenced the development of urban design objectives and principles.

3.2 URBAN DESIGN OBJECTIVES AND DESIGN PRINCIPLES

3.2.1 OBJECTIVES AND PRINCIPLES

The following objectives and design principles form the basis of the development of the concept design and should be carried through to detailed design and construction.

OBJECTIVE 1

Achieve a project that fits sensitively with the existing qualities and characteristics of Nowra, North Nowra, Bomaderry and its Shoalhaven River setting.

Principles:

- Protect and integrate the river environment including foreshore areas, into the overall project design
- Maintain important recognisable views of the river, foreshore areas and townscape, in particular those views to and from the existing southbound bridge
- Design the project to fit in naturally with the local topography and river setting
- Design major project elements like earthworks, embankments and mounding to fit into the landscape setting and reduce its visual and physical obtrusiveness
- Integrate natural patterns and ecology into the design of the project, protect creeks, retain physical continuity of natural systems and use natural characteristics in the project's landscape design
- Minimise the intrusion of project related elements on the local landscape such as lighting, barriers, fencing and flood control elements.

OBJECTIVE 2

Contribute to the accessibility and connectivity into and through Nowra and the surrounding areas.

Principles:

- Improve connectivity around and through the proposal study area for all modes of transport and user groups
- Maximise safe pedestrian and bicycle crossings on streets and at intersections that are attractive, easy to use and minimise crossing distances
- Integrate the pedestrian and cycle path of the new northbound bridge into the Shoalhaven City Council's existing and future planned network in Nowra, North Nowra and Bomaderry
- Improve connectivity and access to existing and potential future riverfront public recreation spaces
- Provide attractive, safe and accessible undercroft areas adjacent to the abutments for potential future foreshore and local pedestrian and cycle access
- Enhance the drivers experience with strategic views to and from the bridge, and into the surrounding landscape, fostering a sense of place and local connection.

OBJECTIVE 3

Enhance the quality and value of the public domain within and surrounding the proposal study area.

Principles:

- Design the project to accommodate potential new uses and improvements in existing and proposed public domain spaces along the river foreshore
- Design the project to ensure that the spaces under and around the new northbound bridge are appropriately integrated into the public domain
- Design the project to create town entry treatments that are attractive and inviting
- Design the project to ensure good surveillance for pedestrians and cyclists on and around the new northbound bridge and its approach roads.

OBJECTIVE 4

To minimise impacts on the public realm and surrounding landuses.

Principles:

- Mitigate visual impacts on the public realm as well as private landuses through the considered design of the bridge and the provision of new planting and retention of key established vegetation groupings
- Minimise physical impacts on existing public open space, private landuses, the river and other foreshore areas and land and water based activities adjacent to the new northbound bridge
- Ensure that the design of the new northbound bridge has minimal impact on the current level of functionality of the surrounding landuses
- Integrate the bridge design with the surrounding landscape, minimising loss of vegetation where possible
- Protect the amenity of surrounding communities.

OBJECTIVE 5

Ensure the design responds appropriately to the existing heritage bridge structure.

Principles:

- The scale and form of the new northbound bridge should respond to and complement that of the existing bridge structures ensuring elegant integration of the new northbound bridge design with the existing bridges
- Where possible enhance opportunities to appreciate the heritage bridge's contribution to the setting and character of the area
- Design the new northbound bridge to minimise the loss of views towards the existing southbound bridge
- Design the new northbound bridge to have a contemporary form and scale that complements the existing southbound bridge and allows the heritage bridge to take visual precedence
- Design all of the new bridge elements as part of a unified bridge architecture, minimising the bulk and massing of the bridge elements
- Design the soffit of the new northbound bridge to create a visually attractive form, particularly in areas that will be highly visible to the public
- Design the shared use path on the new northbound bridge such that the user experience and amenity is well considered, attractive and comfortable to use, including the consideration of stopping points and views
- Design all lighting and signage on the new northbound bridge to be unobtrusive against the existing bridge and surrounding landscape
- Minimise impact where possible on existing significant Aboriginal and European heritage sites.

3.3 URBAN DESIGN AND LANDSCAPE STRATEGY

This section describes the strategies adopted in the design and the reasoning for the approach taken.

Key strategies adopted in the proposal to achieve the project objectives are (See Figure 41):

- A sense of arrival and departure to the town is created through the design of the two key intersections as well as the juxtaposition of the bridges and the introduction of feature gateway plantings at the two key intersections. The plantings clearly distinguish the bridge approach and roads leading to Bridge Road
- The design of the new bridge over Shoalhaven River is simple and elegant with due consideration to the existing southbound bridge as the primary visual focus
- Key visual corridors to the hinterland and bridge structures are retained with sensitive planting that creates an interplay between masses and voids in the landscape
- The design maximises areas for planting within the road corridor, including selective medians south of the bridge, to reduce the apparent scale of the widened roadway and balance the hard surfaces with vegetation to reflect the role of the highway as the primary arterial road and its importance as the signature road corridor as it passes through Nowra
- New road landform is integrated through landscape strategies with the surrounding flat floodplain. The existing character of dense vegetation either side of the Princes Highway is reinstated through native tree planting
- Formal town entry planting and signage is incorporated into the new intersection of the Princes Highway and Bridge Road to replace the existing planting and signage removed by the works
- The acquired properties on Illaroo Road allow for an extension to Rotary Park with turf planting and scattered trees which would enhance the approach to Nowra Bridge. The area could also be utilised for potential future development
- The existing active transport network is retained where possible. A new shared use path is included on the new northbound bridge connecting to the wider network. The existing shared use paths beneath the bridge structures are reconstructed and tie into the existing network. A new shared use path is included on the southern side of the new section of Pleasant Way
- The Bomaderry Creek riparian corridor is reinstated through planting of similar tree species where impacted
- The design would integrate sustainable landscapes with low maintenance and whole of life strategies
- The design would apply water sensitive urban design to streetscapes, parks and open spaces to assist with flood mitigation and also to improve water quality and add value for the community.

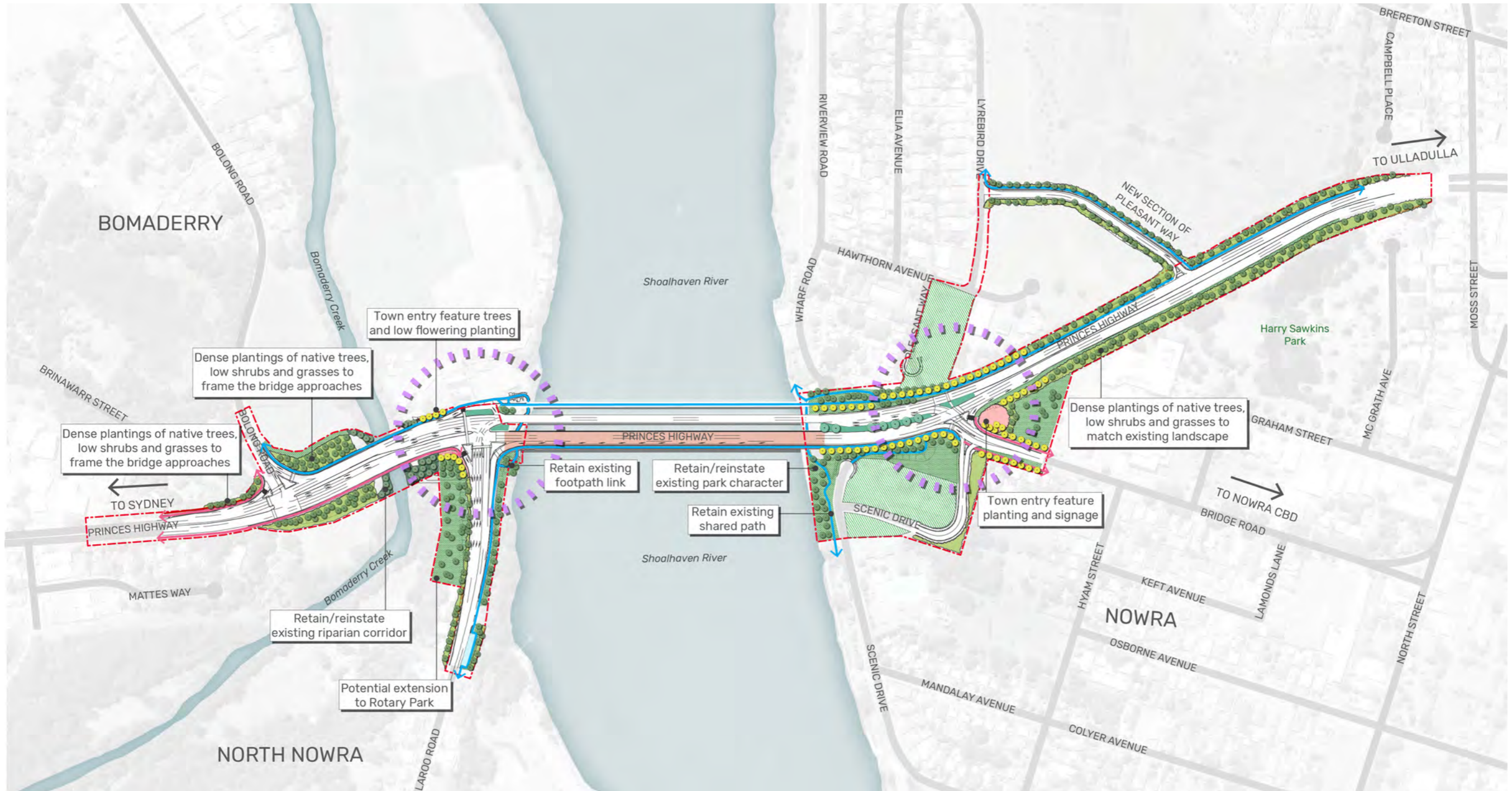


Figure 41. Strategy plan

- KEY**
- New Northbound Bridge
 - Native planting
 - Riparian planting
 - Formal town entry planting
 - Median planting
 - Turf planting
 - Cleared area
 - Car park
 - Shared use path
 - Footpath
 - Key intersection
 - Native tree
 - Riparian tree
 - Feature tree
 - Median tree





Figure 42. View for traffic travelling over the existing southbound bridge

Source: <https://www.flickr.com/photos/44181937@N02/11975524146/>

Chapter 4

URBAN AND LANDSCAPE CONCEPT DESIGN

4.1 INTRODUCTION

The urban design, bridge and landscape concept has been developed based on the objectives and principles described in Chapter 3 to achieve an integrated concept design for the proposal. This chapter describes the interrelationship between the new northbound bridge and proposed road works and the adjoining areas in the form of an indicative urban design and landscape concept plan. The landscape concept design presented includes the new northbound bridge, pedestrian and cycle paths, cuttings and fill embankments. The structures shown on the drawings in this chapter reflect the current engineering concept design for the structural elements; for a detailed discussion and drawings of the structures, refer to the corresponding sections of the REF. The landscape concept includes planting to integrate the proposed works with the existing character of the local area, as well as feature planting to define the town entries and other cultural areas.

Further mitigation measures are identified in Chapter 6 of this report, where opportunities to better integrate the proposal into the landscape setting are described. The detailed design and documentation of these works, both inside and outside the proposal study area would be the subject of comprehensive consultation with a range of stakeholders, including State government agencies, Shoalhaven City Council and the local community.

4.2 APPROACH TO PROPOSED DESIGN

The approach to urban design for the proposal, its structures and planting is to achieve a simple and elegant design outcome that integrates well with the existing landform and land use and minimises the visual impact of the new structures as far as possible, through considered design measures.

The aim is to achieve a design that fits well with the existing landscape and mitigates the impact of the new structures introduced, both for the adjacent residents as well as the pedestrians, cyclists and motorists using the roadway.

The design of the built and natural elements of the proposal considers several factors, including:

- Existing character of the road corridor and the immediate surrounding areas
- Character of roads in the South Coast in general and new upgrades considered as successful by Roads and Maritime
- Existing land uses and related issues such as property access, utilities and services, privacy, glare, visibility of structures and potential for vegetation screening

- Pedestrian and cyclist connectivity along and across the road corridor connecting people with public transport, employment areas and recreational walking tracks
- Constructability and maintenance requirements.

4.3 NORTH NOWRA/BOMADERRY

ROADWORKS

PRINCES HIGHWAY

From the north, the proposed works would commence 150 metres north of the intersection with Bolong Road (Figure 43). The Princes Highway would be widened to accommodate three lanes of traffic in both directions. The central median would be widened to about five metres. The Bomaderry Creek Bridge would also be widened to accommodate the additional lanes (Figure 44). The proposed works upgrade the Princes Highway and Illaroo Road intersection to include two southbound right turn lanes from the Princes Highway into Illaroo Road. A slip road is provided into and out of the Perfect Catch Seafoods and Takeaway property. Access is also maintained to the Bryce Farm property on the eastern side of the Princes Highway.

The proposed works would see embankments introduced on both sides of the Princes Highway resulting in the loss of significant vegetation (Figure 45). Native tree planting is proposed either side of the Princes Highway, where utility services permit, to retain the existing character. These plantings would serve to stabilise the proposed batters and frame the view for motorists traveling towards Nowra Bridge. Riparian revegetation is proposed either side of the highway near Bomaderry Creek using plant species of the nearby vegetation. Feature planting is proposed either side of the highway to indicate the approach to Nowra Bridge. Verges throughout the proposal would be turfed to be consistent with the existing verges.

A 1.5 metre wide footpath is proposed on the eastern side of the Princes Highway from the northern extent of works, turning east onto Bolong Road. A 1.5 metre footpath is reconstructed on the western side of the Princes Highway to match the existing footpath. A 2.5 metre shared use path is provided on the eastern side of the Princes Highway from Bolong Road to the existing southbound bridge. The path under the existing bridges would be extended under the new northbound bridge to maintain the grade separated crossing of the Princes Highway. The existing southbound bridge has been outlined as a potential future shared use path across the river but this will be studied in a separate project and not included as part of the proposed works. Signalised pedestrian crossings are proposed at the northern and eastern sides of the Princes Highway and Bolong Road intersection and the northern and western sides of the Princes Highway and Illaroo Road intersection.

BOLONG ROAD

Minor at-grade works at the Bolong Road intersection would be carried out to accommodate longer truck movements from Bolong Road to the Princes Highway. The existing shared use path on the southern side of Bolong Road would be reconstructed to tie into the shared use path at the extent of works (Figure 43). The existing footpath on the northern side of Bolong Road would be reconstructed to tie into the footpath at the extent of works.

ILLAROO ROAD

The proposed works would see the widening of Illaroo Road over a distance of about 270 metres. The Princes Highway and Illaroo Road intersection would be upgraded to provide three dedicated right turn lanes and one dedicated left turn at any time lane from Illaroo Road to the Princes Highway. A 150m westbound slip lane would be added to Illaroo Road to assist merging traffic that turned left into Illaroo Road from the Princes Highway (Figure 47).

Ten existing residential properties on the north side of Illaroo Road would be acquired as part of the proposed works with open space and embankments introduced in their place (Figure 48). The area could also be utilised for potential future development. The land would be planted with native shrubs and trees to create a park-like character. Feature trees would be planted to the corner of Illaroo Road and the Princes Highway to indicate both the approach to Nowra Bridge and the Illaroo Road intersection as a neighbourhood entry for North Nowra. The proposal would also include a drainage swale within the area, with a maintenance access track proposed off Illaroo Road.

The proposed works on the southern side of Illaroo Road would require significant vegetation removal. As far as practicable established vegetation, particularly mature trees, would be retained and supplemented with new native tree planting to retain the existing densely vegetated character of existing Rotary Park.

The existing 2.5 metre shared use path on the southern side of Illaroo Road would be reconstructed to tie into the proposed shared use path on the new northbound bridge. The existing car park near Rotary Park would be relocated west near the Illaroo Road and Fairway Drive intersection.

RETAINING WALL

A retaining wall would be required on the eastern side of the Princes Highway north of the Princes Highway and Bolong Road intersection to minimise project footprint from spilling into adjacent properties (Figure 43). The retaining wall would be 106.5 metres long and up to one metre high (Figure 44).

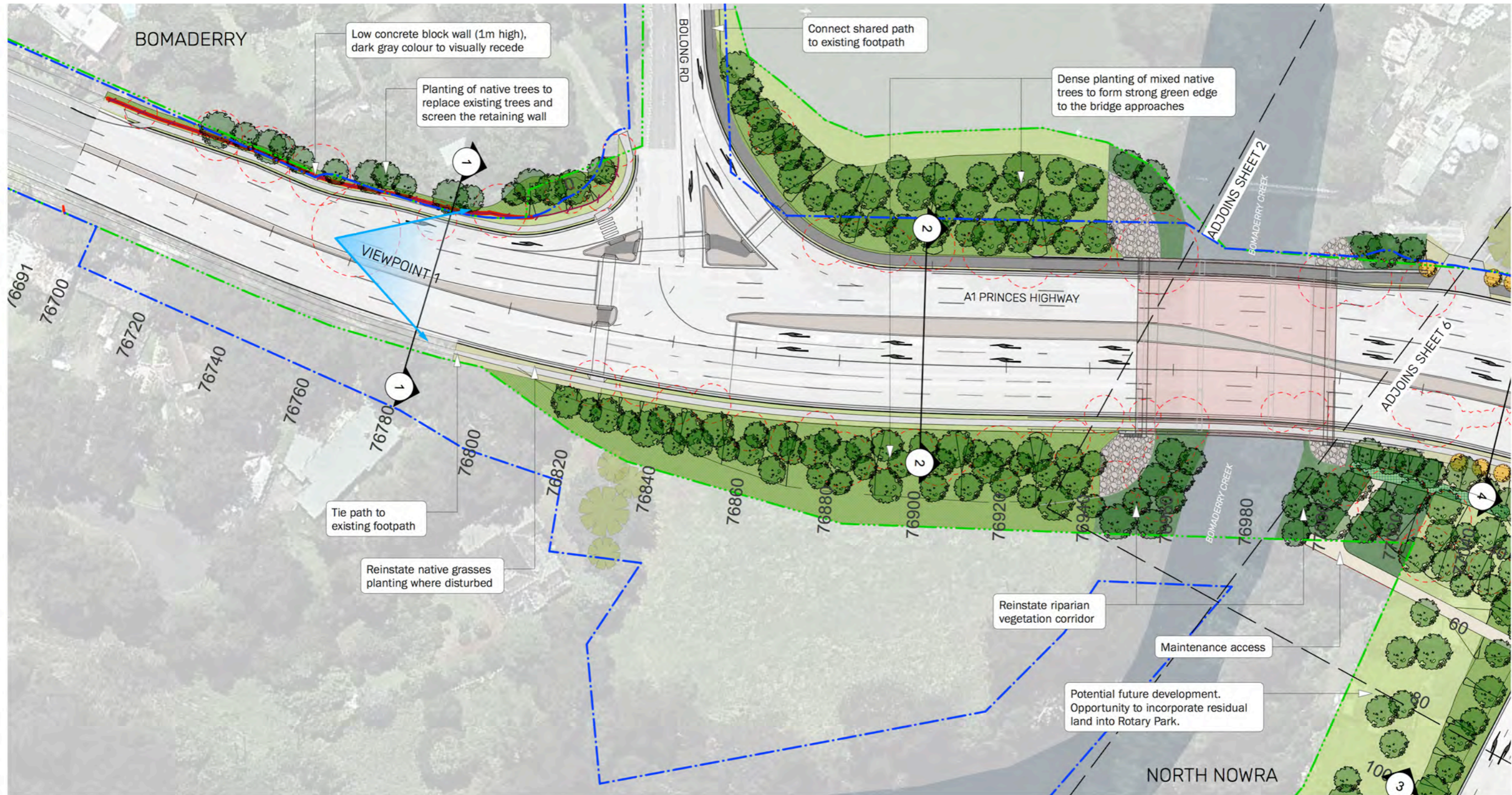
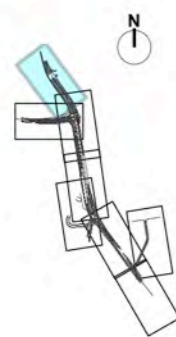
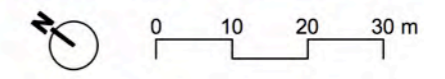


Figure 43. Urban and landscape concept design plan - Sheet 1



LEGEND

PROPOSED TREES

- Native trees
- Ornamental tree
- Existing tree to be retained (within project area)
- Indicative extent of removed trees

VEGETATION

- Turf
- Groundcovers and grasses
- Small-medium native shrubs
- Riparian planting
- Vegetated swale
- Formal feature planting

PROPOSED SURFACES

- Carriageway
- Shared path
- Footpath
- Concrete medians
- Scour protection

STRUCTURES

- Bridge
- Biodetention basin
- Cut and fill embankment
- Retaining wall

OTHER

- Fence
- Key views
- Project boundary
- Clearing boundary
- Existing path
- Ancillary construction area

Section marker



Figure 44. Section 1 through the Princes Highway - Chainage 76780 (Scale 1:250)

- Note: 1. Proposed planting shown at maturity
 2. Subject to further design development and consultation.

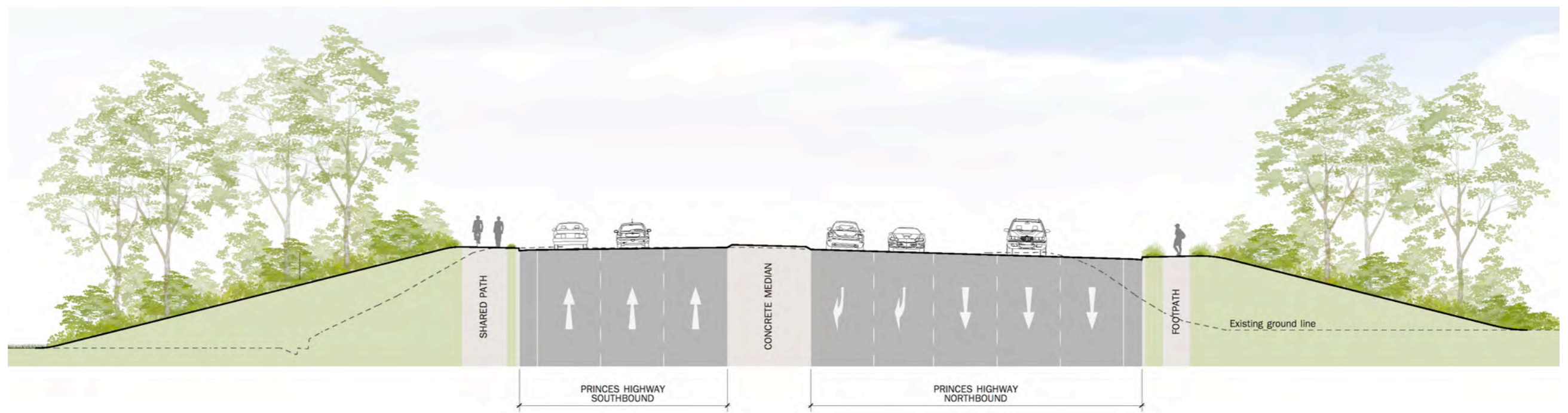


Figure 45. Section 2 through the Princes Highway - Chainage 76900 (Scale 1:250)

- Note: 1. Proposed planting shown at maturity
 2. Subject to further design development and consultation.



Figure 46. Viewpoint 1 - Artist's impression of the proposal from the Princes Highway looking south towards the intersection with Bolong Road - Proposal showing mature planting at approximately 10-15 years after road opening

Note: Artist's impression is indicative only and subject to further design development and consultation

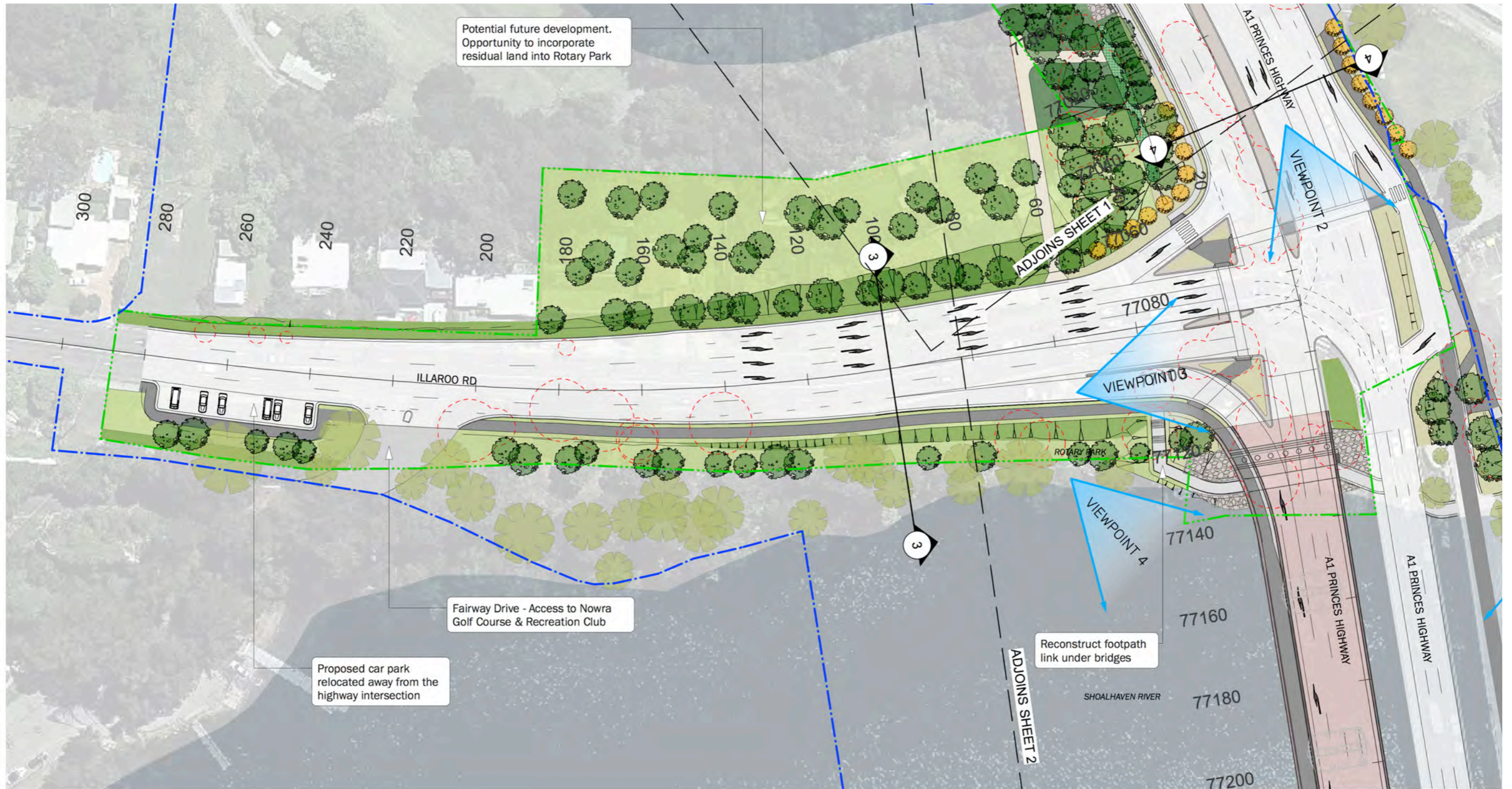
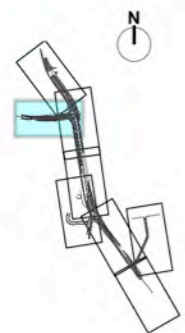


Figure 47. Urban and landscape concept design plan - Sheet 2



LEGEND

PROPOSED TREES

- Native trees
- Ornamental tree
- Existing tree to be retained (within project area)
- Indicative extent of removed trees

VEGETATION

- Turf
- Groundcovers and grasses
- Small-medium native shrubs
- Riparian planting
- Vegetated swale
- Formal feature planting

PROPOSED SURFACES

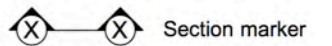
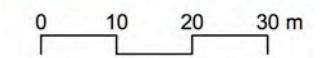
- Carriageway
- Shared path
- Footpath
- Concrete medians
- Scour protection

STRUCTURES

- Bridge
- Biodetention basin
- Cut and fill embankment
- Retaining wall

OTHER

- Fence
- Key views
- Project boundary
- Clearing boundary
- Existing path
- Ancillary construction area



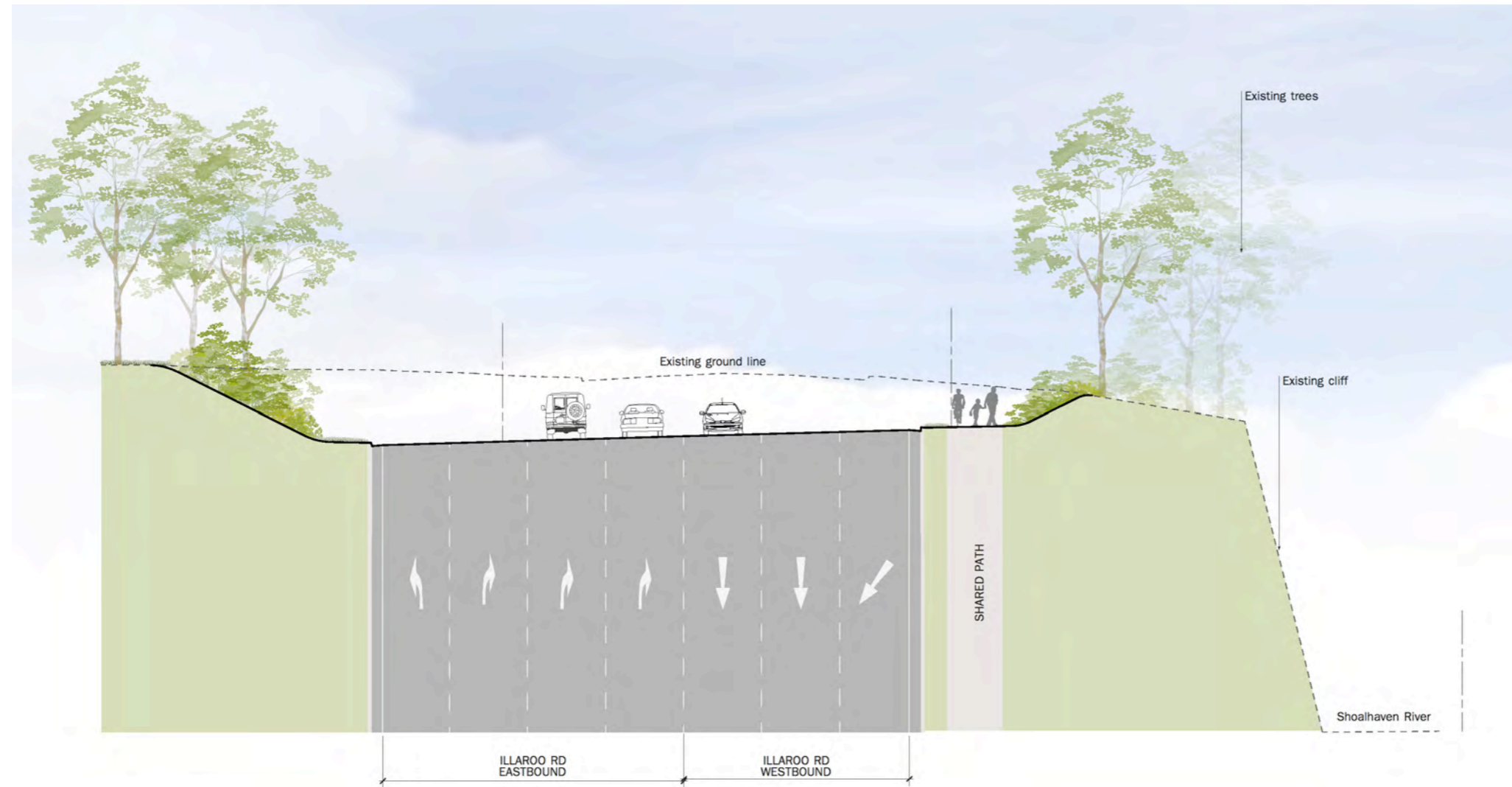


Figure 48. Section 3 through Illaroo Road - Chainage 100 (Scale 1:250)

- Note: 1. Proposed planting shown at maturity
 2. Subject to further design development and consultation.

4.4 NEW NORTHBOUND BRIDGE

OVERVIEW

The concept design for the new northbound Nowra Bridge has been developed through an iterative process where the project team members from all relevant disciplines have worked collaboratively to achieve an integrated outcome for the bridge. The urban design concept for the bridge has been developed in accordance with the Roads and Maritime Bridge Aesthetics (2012) and in response to the requirements for bridge and structure design, road design, drainage design and lighting design. The following section describes the design outcomes of this process.

The new northbound bridge over the Shoalhaven River would be a post-tensioned concrete girder bridge (Incrementally launched). The new northbound bridge would be 360 metres long and located west, upstream of the existing northbound bridge (Figure 49). The new northbound bridge would have four northbound lanes including a dedicated continuous slip lane between Bridge Road and Illaroo Road. A shared use path would be located on the upstream side of the new northbound bridge, to connect with the existing local network. The existing northbound bridge would undergo minor lane adjustment to convert it to three lanes of southbound traffic. The shared use path on the existing northbound bridge would also be removed. Traffic would be removed from the existing southbound bridge and the bridge would be adapted for alternative use as determined through a separate project.

SITING RELATIONSHIP TO EXISTING BRIDGE STRUCTURES

The horizontal position of the new northbound bridge over the Shoalhaven River is governed by the need to tie in with the alignment of the Princes Highway near the Bolong Road intersection to the north and the Bridge Road intersection to the south. It is also governed by the need to minimise impacts on the existing landscape character of the area and maintain the existing southbound bridge as the primary visual focus. Within these constraints, the new northbound bridge has been designed to be as close and as parallel as possible to the existing northbound bridge.

The new northbound bridge has 38.5 metre central spans with 33.72 metre abutment spans. There would be nine piers in the Shoalhaven River. The piers have been positioned to align as closely as possible with the piers of the existing bridges. The new northbound bridge structure has been positioned with the soffit level as close as possible to the existing northbound bridge. However, the height of the new northbound bridge also responds to other key factors including:

- The new northbound bridge must allow for 7.13 metre high navigation channels at Mean Low Water Spring (MLWS)
- The depth of the superstructure is governed by the span lengths between the piers, the positions of which have been determined by the positions of the piers on the existing bridges.

Within these parameters, the road level at the centre of the new northbound bridge would be approximately 10.25 metres above the river at MLWS.

OVERALL FORM

The new northbound bridge has a straight horizontal alignment that simplifies construction and harmonises with the straight alignment of the existing bridge. The longitudinal grades have been kept as 'flat' as possible to mirror the flat alignment of the existing bridge while also meeting the necessary drainage requirements (Figure 52).

BRIDGE GIRDERS

The new northbound bridge superstructure would be concrete, which allows for a simple, clean, contemporary character that allows the steel truss of the existing southbound bridge to take visual precedence. The preferred superstructure option would have two box girders that respond to the long spans over the Shoalhaven River and the existing northbound bridge. The girder would be about two metres deep (Figure 53).

An option has also been considered to use a Super-T girder design, which would require the bridge piers to have an integrated headstock and not match the existing northbound bridge. The girder would be about two metres deep (Figure 54).

The twin box girder form with V-shaped piers is the preferred option as it provides the most consistent and sympathetic bridge form in this setting.

The new northbound bridge spans over the Shoalhaven River are 38.5 metres long to match the spans on the existing southbound bridge. The length of the spans necessitate an approximately two metre deep girder, which combined with the required 1.3 metre high bridge barrier, would result in an overall bridge depth of about 3.3 metres over the river.

BRIDGE DECK

The proposed concrete bridge deck is approximately 21.5 metres wide and accommodates four vehicle lanes, shoulders, a shared use path and barriers. Over the box girder, both sides of the deck would be cantilevered. The cantilevers would cast a shadow on the vertical face of the girder, helping it to visually recede and minimise its visual bulk.

PARAPETS

Simple, unarticulated, precast concrete parapets are proposed for both sides of the bridge. The parapets are designed to appear as crisp, uninterrupted, linear elements that extend the full length of the bridge to beyond the abutments, helping to emphasise the horizontal line and to anchor both sides of the bridge beyond the shores of the river. The outer face of the parapets angle slightly out at the bottom to better catch the sunlight, helping to visually define them against the girder. The parapets extend below the deck soffit to increase the depth of shadow cast on the girder, helping to make the girder visually recede.

PIERS

The new northbound bridge structure would have nine piers. The bridge pier form and location would correlate with the existing bridge piers to minimise impact on the waterway and maintain existing access for water vessels. This would also help to visually associate the new bridge with the existing concrete bridge.

PILE CAPS

The proposed pile caps, situated in the Shoalhaven River, finish above MHWS in order to be visible to boats as a safety precaution (Figure 53 and Figure 54). These pile caps would have a precast concrete skirt with rounded ends that reference the shape of the pile caps of the existing northbound bridge.

ABUTMENTS

The proposed spill through bridge abutments would tie into the existing abutments and would be finished as rock pitched. The rock would be sourced from local quarries. Rip-Rap scour protection would tie back into the existing scour protection where required.

VEHICLE BARRIERS

Vehicle barriers are required at the shoulders of the carriageway on the bridge. The barriers would be 1.3 metres high and would be concrete under twin rail steel barriers, which would allow views out to the river from the roadway.

PEDESTRIAN AND CYCLE PATH

The new northbound bridge includes a 3.5 metre wide shared use path to improve pedestrian and cyclist connectivity between Nowra and North Nowra. The shared use path is located on the western (upstream) side of the bridge to facilitate connections to existing path systems in Nowra and North Nowra.

At the edge of the shared use path, a 1.3 metre high railing would be integrated with the bridge parapet to provide safety for pedestrians and cyclists.

The existing shared use path on the existing northbound bridge would be removed as part of the proposed works.

BRIDGE LIGHTING

Lighting would be provided on the new northbound bridge to meet the relevant standards. Proposed lighting has the potential to change the character of the area at night and impact on adjoining residential areas as a result of light spill and through potentially reducing the prominence of the existing southbound bridge.

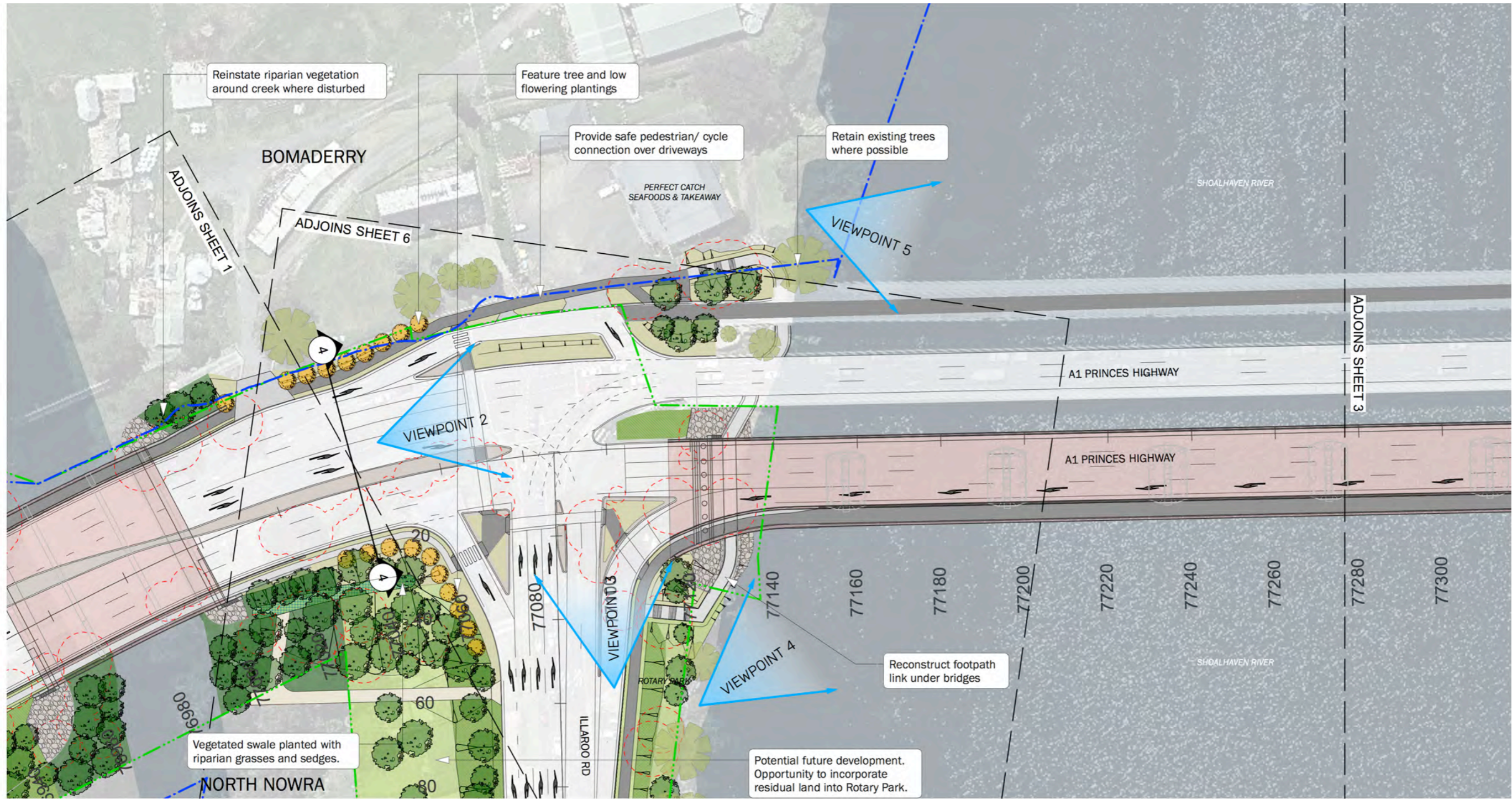
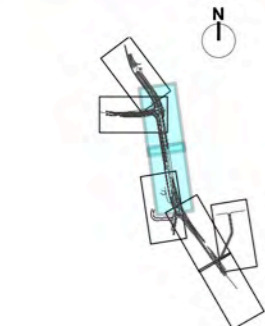
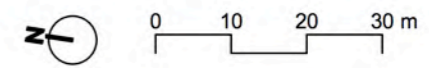
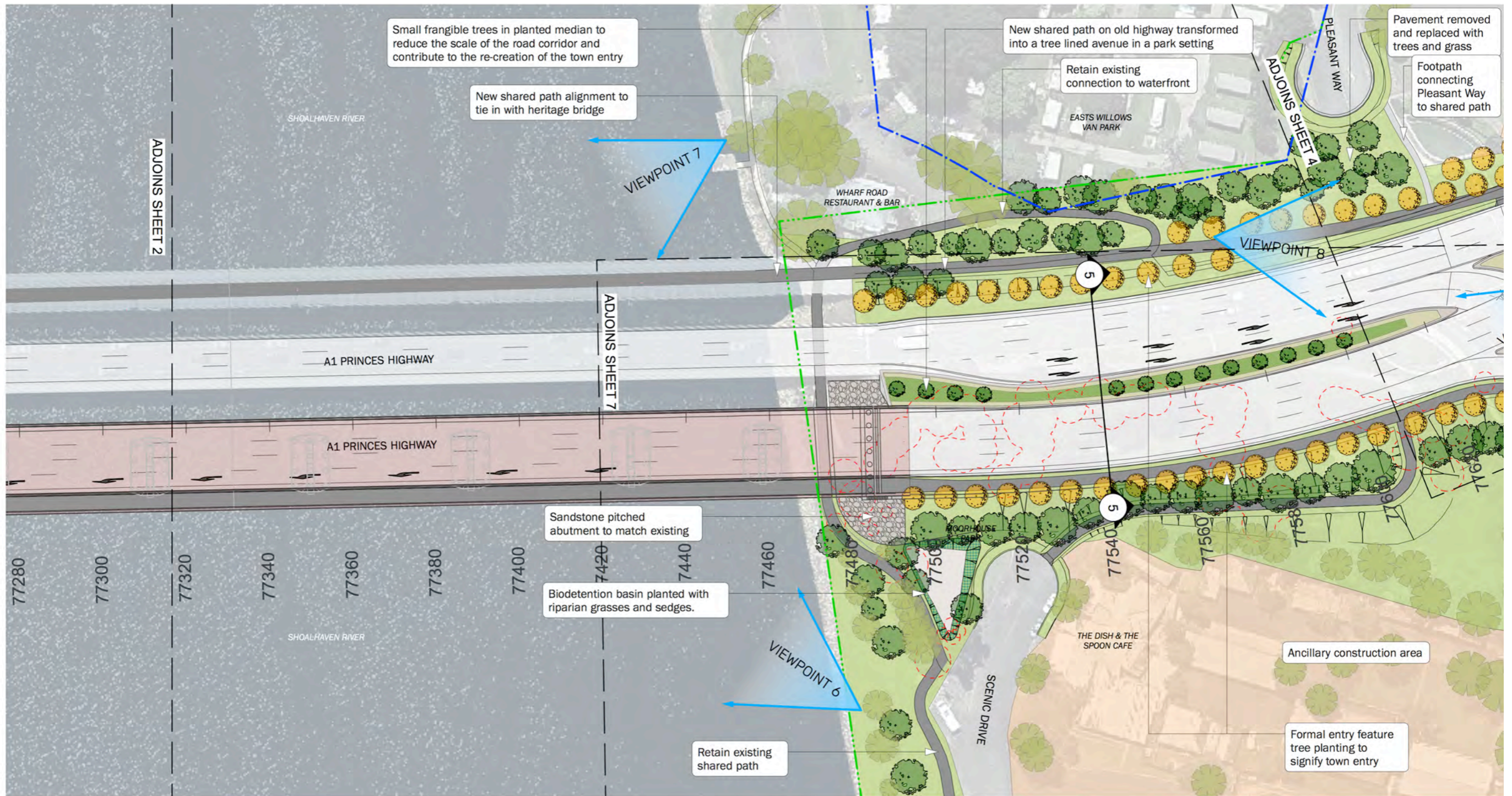


Figure 49. Urban and landscape concept design plan - Sheets 3 and 4





LEGEND

PROPOSED TREES

- Native trees
- Ornamental tree
- Existing tree to be retained (within project area)
- Indicative extent of removed trees

VEGETATION

- Turf
- Groundcovers and grasses
- Small-medium native shrubs
- Riparian planting
- Vegetated swale
- Formal feature planting

PROPOSED SURFACES

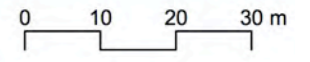
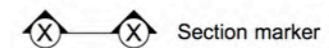
- Carriageway
- Shared path
- Footpath
- Concrete medians
- Scour protection

STRUCTURES

- Bridge
- Biodetention basin
- Cut and fill embankment
- Retaining wall

OTHER

- Fence
- Key views
- Project boundary
- Clearing boundary
- Existing path
- Ancillary construction area



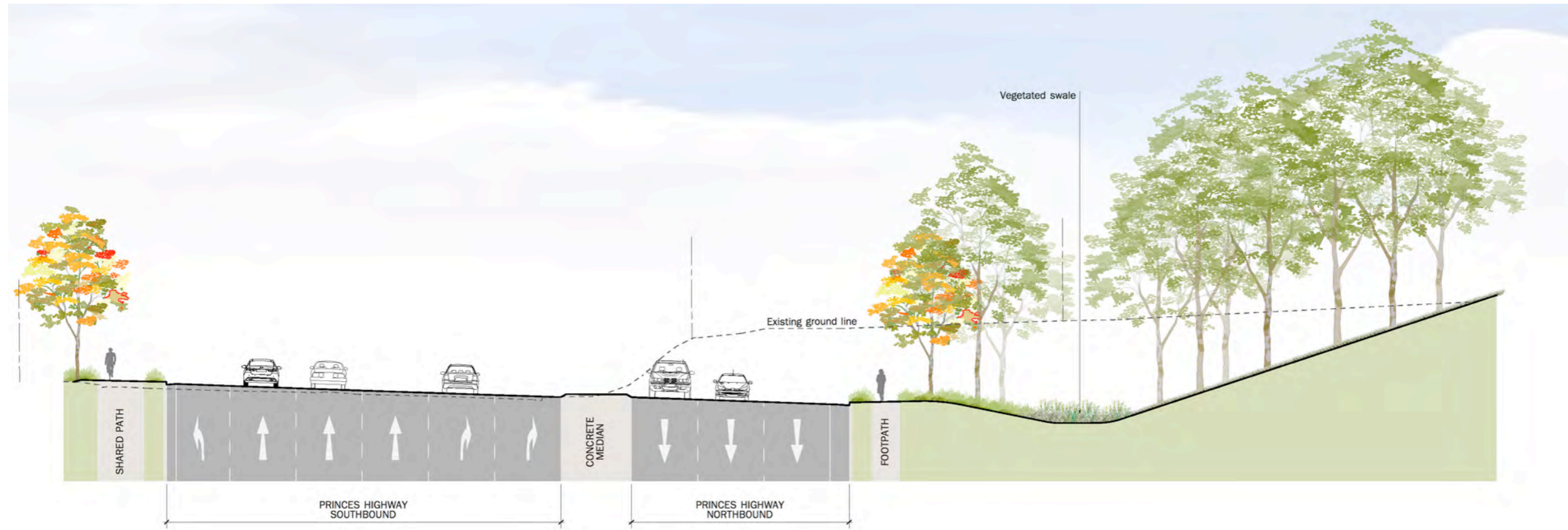


Figure 50. Section 4 through the Princes Highway - Chainage 77040 (Scale 1:250)

Note: 1. Proposed planting shown at maturity
 2. Subject to further design development and consultation.

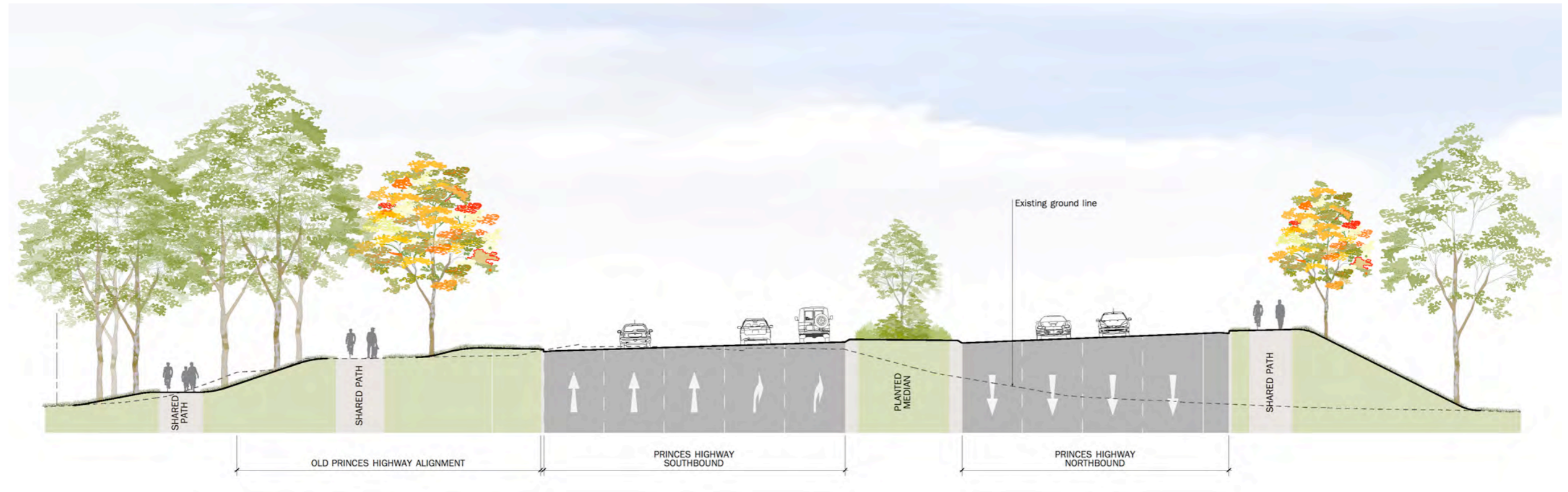


Figure 51. Section 5 through the Princes Highway - Chainage 77540 (Scale 1:250)

Note: 1. Proposed planting shown at maturity
 2. Subject to further design development and consultation.

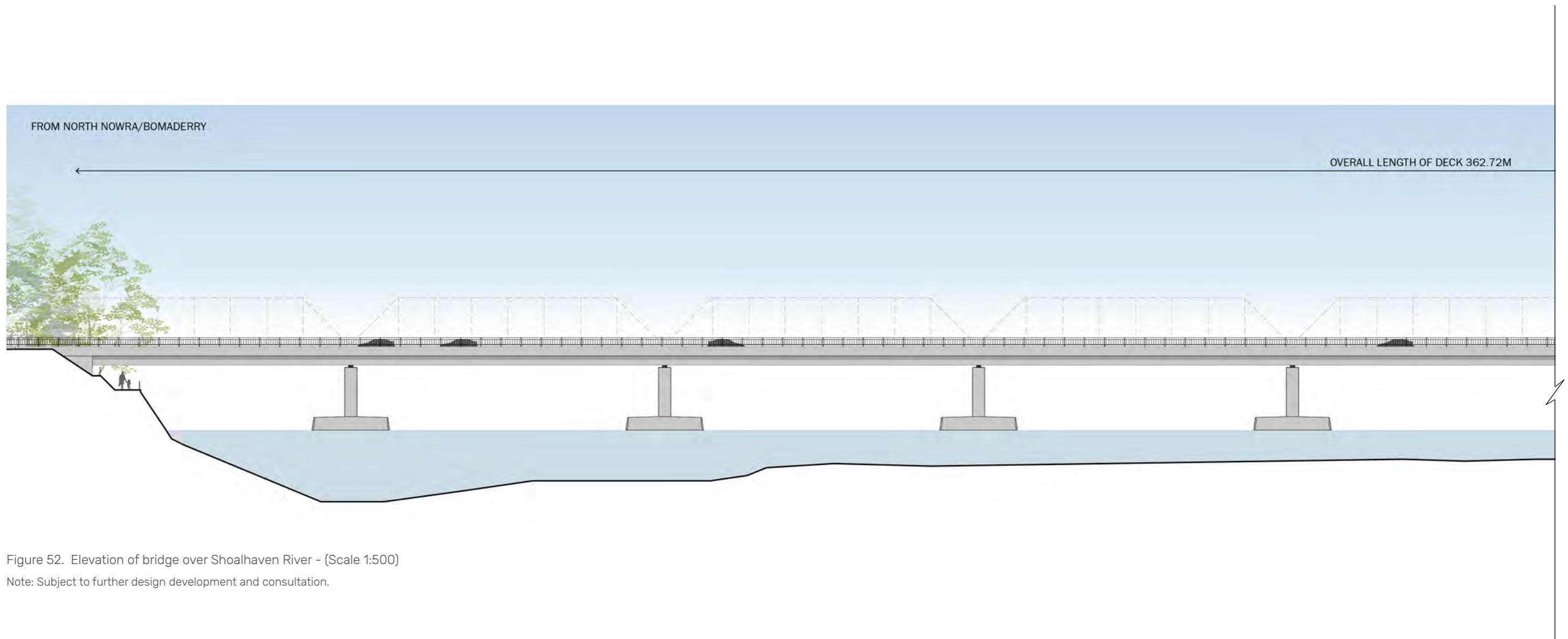
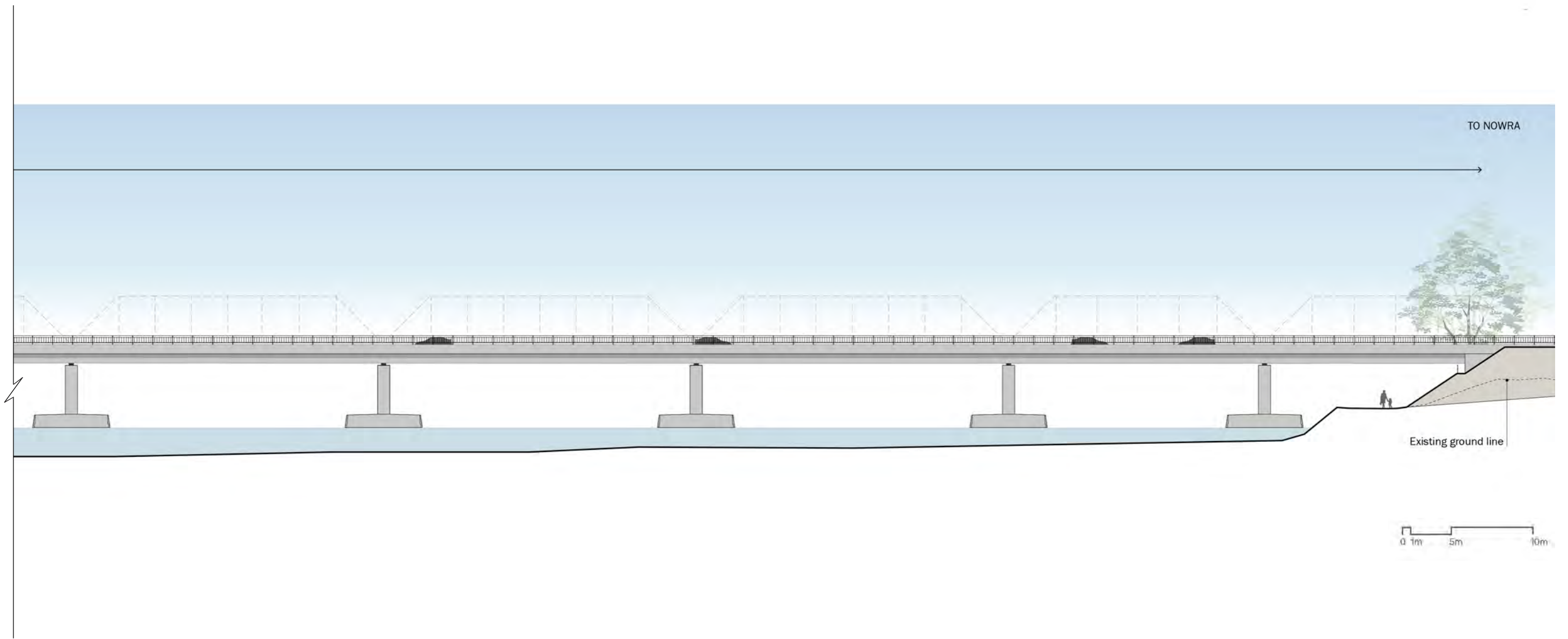


Figure 52. Elevation of bridge over Shoalhaven River - (Scale 1:500)

Note: Subject to further design development and consultation.



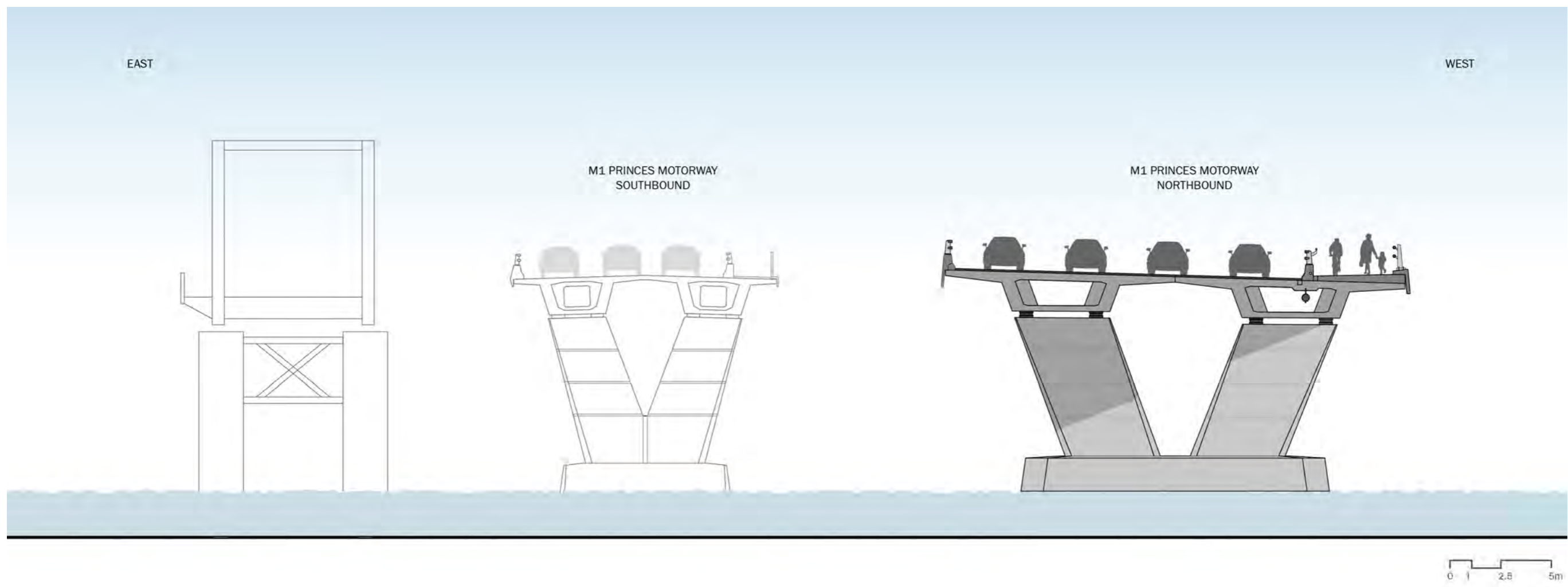


Figure 53. Section through bridge over Shoalhaven River - Incrementally Launched Option (Preferred)
 Note: Subject to further design development and consultation.

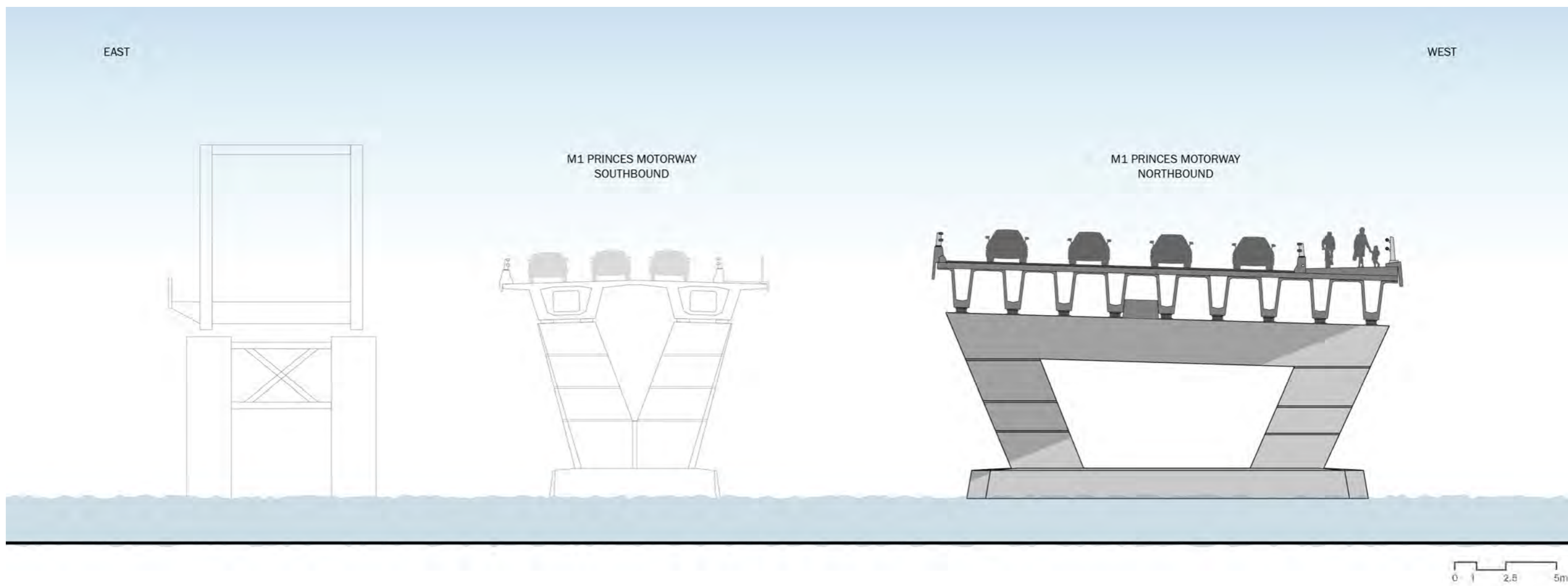


Figure 54. Section through bridge over Shoalhaven River - Super-T Option
 Note: Subject to further design development and consultation.



Figure 55. Viewpoint 6 – Artist's impression of proposal from the southern Shoalhaven River foreshore looking northeast – Incrementally Launched Option (Preferred)
Note: Artist's impression is indicative only and subject to further design development and consultation



Figure 56. Viewpoint 6 – Artist's impression of proposal from the southern Shoalhaven River foreshore looking northeast – Super-T Option
Note: Artist's impression is indicative only and subject to further design development and consultation

4.5 NOWRA

ROADWORKS

PRINCES HIGHWAY

South of the new northbound bridge, proposed works would upgrade the Princes Highway to provide three northbound and three southbound lanes through to about 75 metres north of Moss Street (Figure 58). The Princes Highway and Bridge Road intersection would be upgraded to provide two southbound right turn lanes from the Princes Highway into Bridge Road. A planted median would separate the carriageways from the new northbound bridge through to the Bridge Road intersection. A planted/ concrete median would separate the carriageways from the intersection to the southern end of the proposed works. The existing Pleasant Way access would be closed off, turning the Princes Highway and Bridge Road intersection into a T-intersection. There would be no right turn from Bridge Road onto the Princes Highway. A new local road would be constructed, connecting Lyrebird Drive to the Princes Highway, about 300 metres south of the existing Pleasant Way intersection.

The existing southbound carriageway from the existing southbound bridge would be planted with native trees and groundcovers. Feature trees are proposed along the relocated section of the southbound carriageway to indicate the approach to the Princes Highway and Bridge Road intersection. Proposed native tree planting would continue on the eastern side of the proposal to the extent of works, reinstating the existing character of a tree-lined corridor. Existing trees would be retained where possible. The proposal would introduce a wide embankment on the western side of the Princes Highway. The 1:2 batters would be turfed and scattered native trees would be planted to reinstate the existing parkland character of the area. Feature tree planting next to the carriageway would indicate the approach to the new northbound bridge as well as reduce the perceived scale of the paved area and provide shade for pedestrians and cyclists. Native tree planting would continue on the western side of the proposal, reinstating the existing character of a tree-lined corridor. Existing trees would be retained where possible.

The 3.5 metre wide shared use path on the western side of the new northbound bridge would continue along the Princes Highway to Bridge Road. A shared use path is proposed on the eastern side of the highway from the existing southbound bridge along the eastern side of the Princes Highway to the southern extent of the proposal. Shared use paths are proposed on both the eastern and western side of the highway to connect the highway to the river foreshore. A shared use path is also proposed for the southern side of the new section of Pleasant Way, connecting to Lyrebird Drive. Pedestrian crossing facilities are proposed for the southern and western sides of the intersection of the Princes Highway and Bridge Road.

BRIDGE ROAD/SCENIC DRIVE

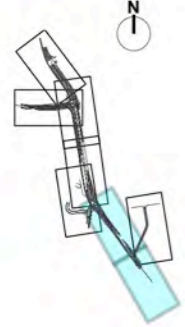
Proposed local road adjustments would include restricting turning movements at the intersection of Bridge Road and Scenic Drive to left in left out only. The shared use path on the western side of the Princes Highway would continue on Bridge Road to Scenic Drive. The existing footpaths west of Scenic Drive and on the southern side of Bridge Road would be retained. Feature planting is proposed along either side of Bridge Road to the extent of works.

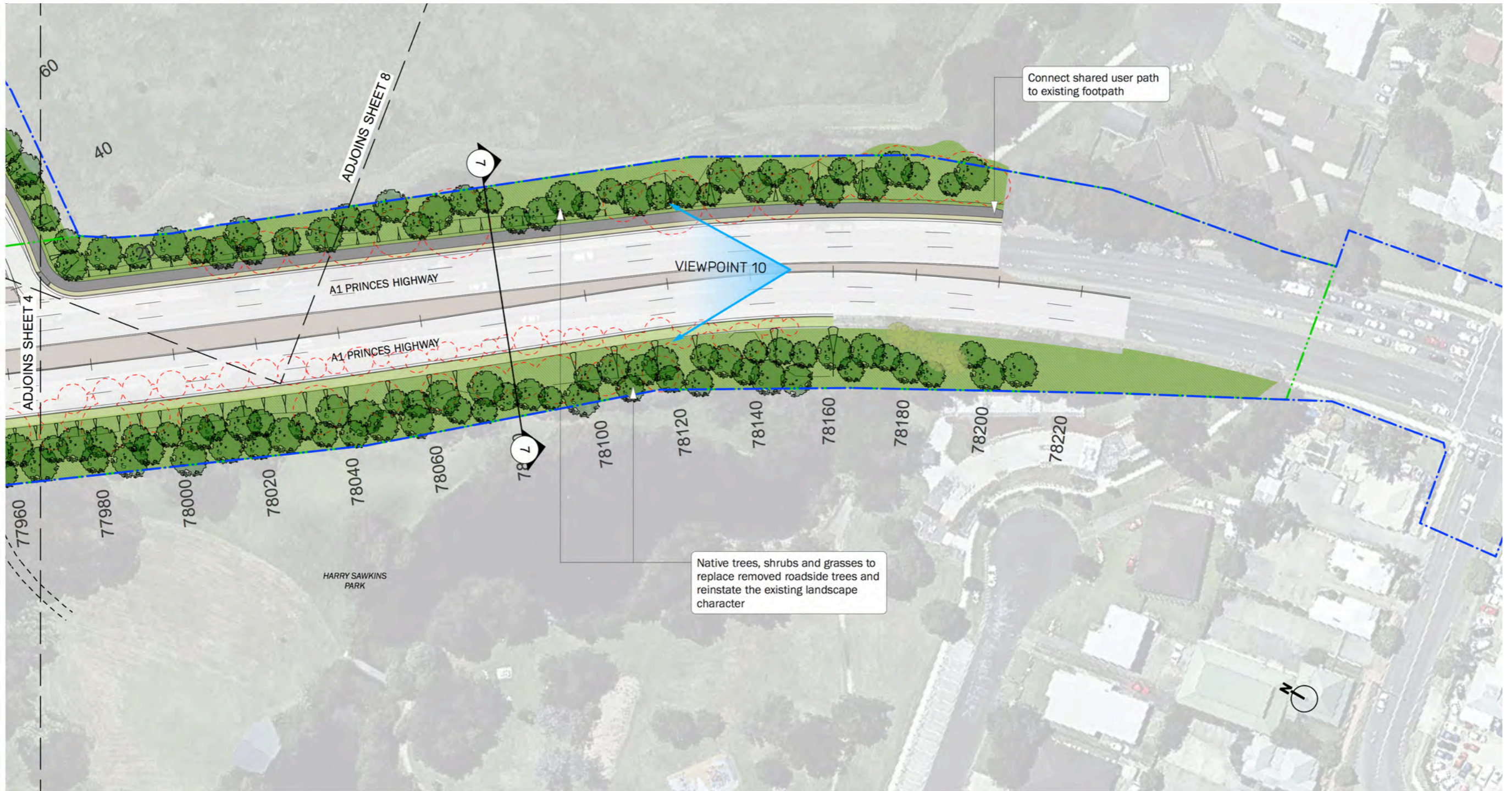


Figure 57. View looking southwest from the shared use path south of the existing southbound bridge







Figure 58. Urban and landscape concept design plan - Sheets 5 and 6











LEGEND






PROPOSED TREES

-  Native trees
-  Ornamental tree
-  Existing tree to be retained (within project area)
-  Indicative extent of removed trees





VEGETATION

-  Turf
-  Groundcovers and grasses
-  Small-medium native shrubs
-  Riparian planting
-  Vegetated swale
-  Formal feature planting







PROPOSED SURFACES


-  Carriageway
-  Shared path
-  Footpath
-  Concrete medians
-  Scour protection

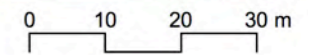
STRUCTURES

-  Bridge
-  Biodetention basin
-  Cut and fill embankment
-  Retaining wall

OTHER

-  Fence
-  Key views
-  Project boundary
-  Clearing boundary
-  Existing path
-  Ancillary construction area

 Section marker



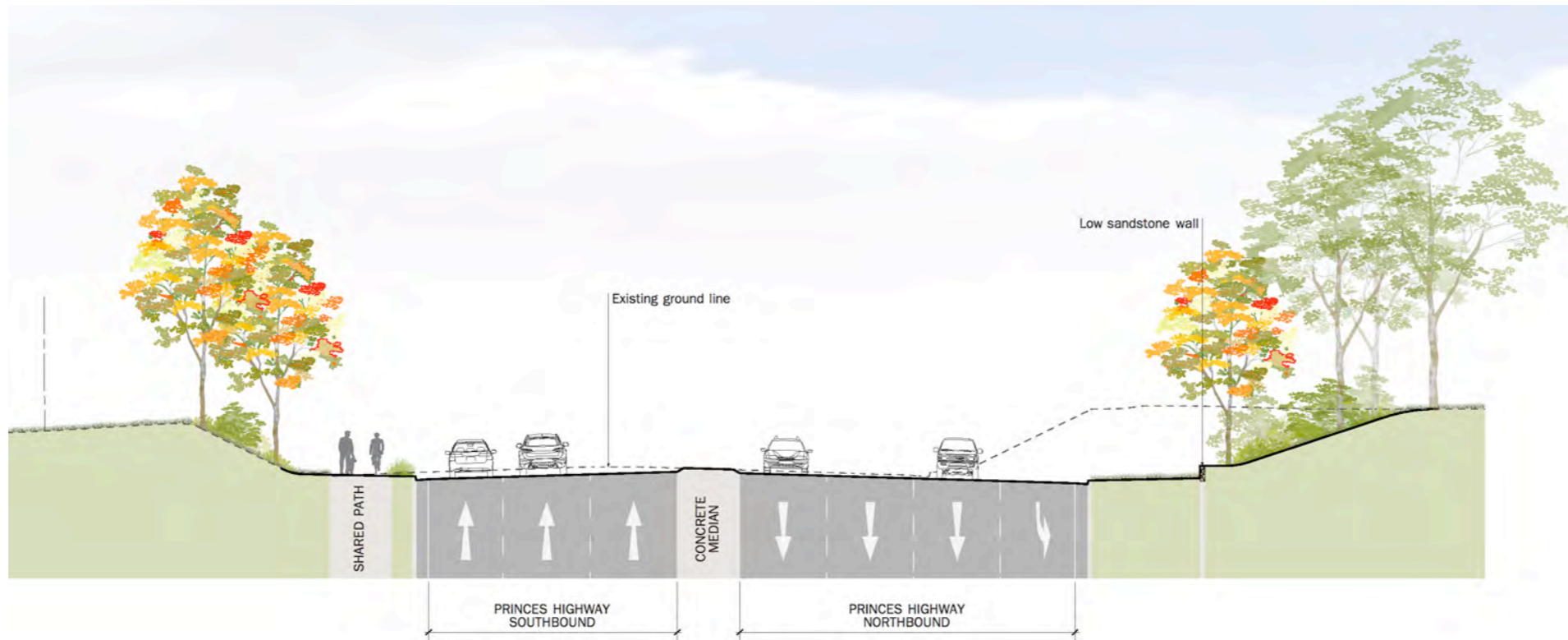


Figure 59. Section 6 through the Princes Highway - Chainage 77720 (Scale 1:250)
 Note: 1. Proposed planting shown at maturity
 2. Subject to further design development and consultation.



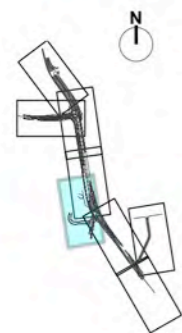
Figure 60. Section 7 through the Princes Highway - Chainage 78080 (Scale 1:250)
 Note: 1. Proposed planting shown at maturity
 2. Subject to further design development and consultation.



Figure 61. Viewpoint 8 - Artist's impression of proposal from the Princes Highway looking south - Proposal showing mature planting at approximately 10-15 years after road opening
Note: Artist's impression is indicative only and subject to further design development and consultation



Figure 62. Urban and landscape concept design plan - Sheet 7



LEGEND

PROPOSED TREES

- Native trees
- Ornamental tree
- Existing tree to be retained (within project area)
- Indicative extent of removed trees

VEGETATION

- Turf
- Groundcovers and grasses
- Small-medium native shrubs
- Riparian planting
- Vegetated swale
- Formal feature planting

PROPOSED SURFACES

- Carriageway
- Shared path
- Footpath
- Concrete medians
- Scour protection

STRUCTURES

- Bridge
- Biodetention basin
- Cut and fill embankment
- Retaining wall

OTHER

- Fence
- Key views
- Project boundary
- Clearing boundary
- Existing path
- Ancillary construction area

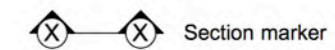
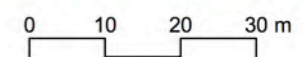


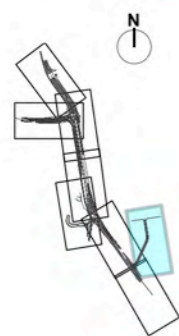


Figure 63. Section 8 through the Bridge Road - Chainage 80 (Scale 1:250)

- Note: 1. Proposed planting shown at maturity
 2. Subject to further design development and consultation.



Figure 64. Urban and landscape concept design plan - Sheet 8



LEGEND

PROPOSED TREES

- Native trees
- Ornamental tree
- Existing tree to be retained (within project area)
- Indicative extent of removed trees

VEGETATION

- Turf
- Groundcovers and grasses
- Small-medium native shrubs
- Riparian planting
- Vegetated swale
- Formal feature planting

PROPOSED SURFACES

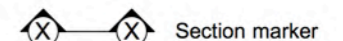
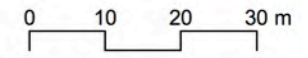
- Carriageway
- Shared path
- Footpath
- Concrete medians
- Scour protection

STRUCTURES

- Bridge
- Biodetention basin
- Cut and fill embankment
- Retaining wall

OTHER

- Fence
- Key views
- Project boundary
- Clearing boundary
- Existing path
- Ancillary construction area



CUTTINGS AND FILL EMBANKMENTS

Cuttings and fill embankments are required to reconcile the upgraded bridge approach road levels with the existing ground levels. They are required due to the necessary elevated level of the bridge that addresses flooding and navigational requirements and the minimum geometric requirements for the horizontal and vertical road alignment to meet the relevant design standards (Figure 65).

The types of earthworks formations required for this proposal are:

- Cuttings - where Illaroo Road, which would be lowered, would be situated below the existing ground, requiring excavation
- Fill embankments - where the approach roads on both sides of the river would be situated above the existing ground, requiring the road to be elevated.

PEDESTRIAN AND CYCLE PATHS

The new northbound bridge includes a 3.5 metre wide pedestrian and cycle path to improve shared user connectivity between Nowra and North Nowra/Bomaderry. The pedestrian and cycle path is located on the western (upstream) side of the bridge to facilitate connections to existing path systems in Nowra and North Nowra. At the edge of the shared use path, a 1.3 metre high shared use path railing would be integrated with the bridge parapet.

The shared use path on the existing northbound bridge would be removed. No pedestrian/cycle facilities would be included as part of the proposal.

A 2.5 metre wide shared use path would be constructed along the length of the proposal. There would be a footpath on the western side of the Princes Highway, north of Illaroo Road tying into existing footpaths at the northern extent of works. Signalised pedestrian crossings are proposed for the Bridge Road, Illaroo Road, and Bolong Road intersections.

SAFETY BARRIERS

Road safety barriers are required at the top of fill embankments and in other roadside situations. The preferred type of barrier depends on the location.

FENCING

Fencing is required next to the pedestrian and cycle path, at the top of fill embankments and retaining walls, for safety requirements.

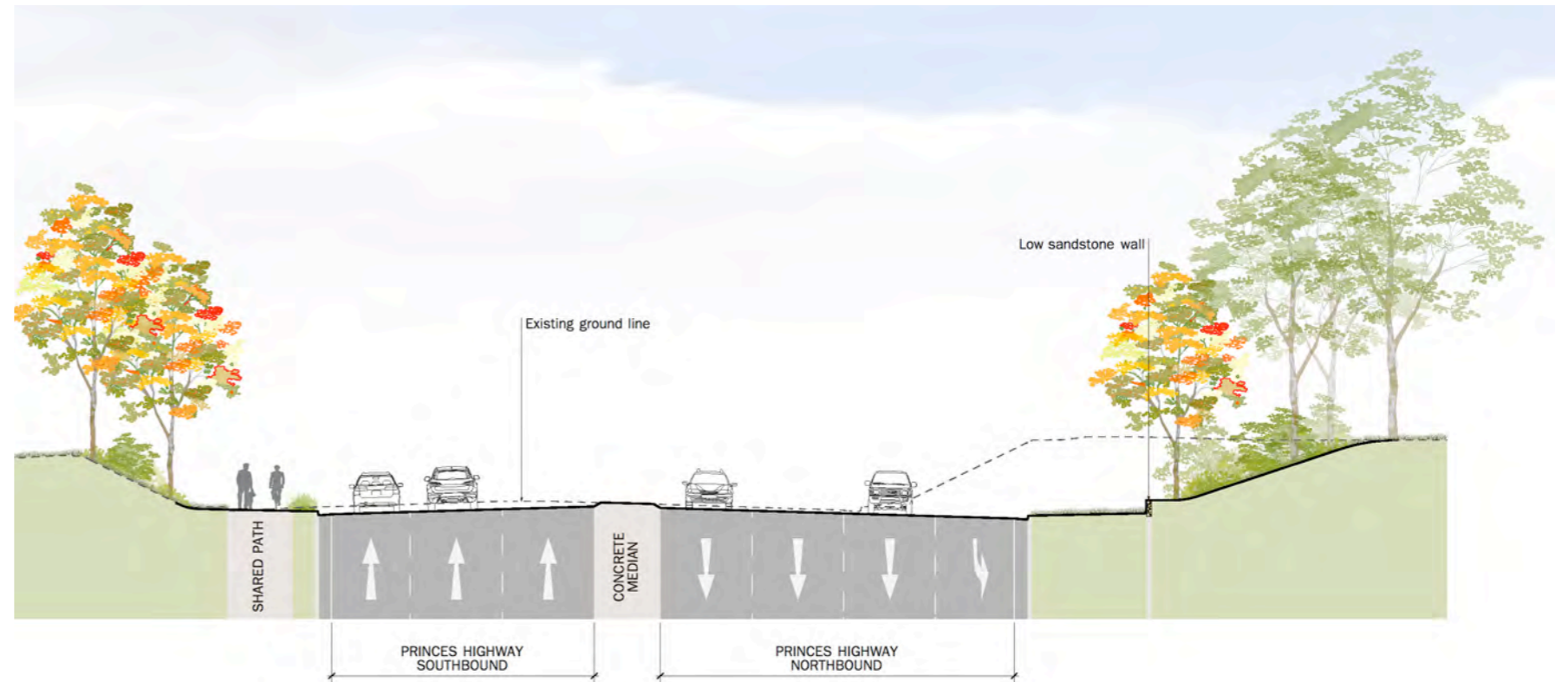


Figure 65. Section through the Princes Highway showing cutting embankments - Chainage 77720 (Scale 1:250)

- Note: 1. Proposed planting shown at maturity
2. Subject to further design development and consultation.

4.6 PLANTING DESIGN

As outlined in the overall urban design strategy, the primary aim is to achieve a project that fits sensitively with the existing qualities and characteristics of Nowra, North Nowra, Bomaderry and its Shoalhaven River setting. Another key strategy for the planting design is to enhance the quality and value of the public domain along and surrounding the proposal study area. The proposed planting design plays an important role in delivering the urban design objectives. These key aims are further discussed below:

1. Integration with existing context

Integration of the upgrade with the existing context would be achieved through maximising appropriate vegetation in the road corridor, within proposal constraints, as well as by reinstating vegetation in areas adjoining and affected by the proposed upgrade.

2. Enhancing public domain

The impacts on public open space would be minimised, particularly on the foreshore areas. Existing trees would be protected where possible, reinstating and complementing those that need to be removed.

A mixture of native and exotic species would contribute to enhance way finding and legibility of the road corridor and create gateway treatments highlighting town entries.

PLANTING DESIGN PRINCIPLES

The planting design has been guided by the following principles:

- Ensure the visual and ecological integrity of the journey
- Provide structured feature planting to improve and strengthen road legibility and to provide visual cues to aid in way finding and enhance identity of the site including:
 - Both bridge approaches
 - Nowra CBD entry through Bridge Road
 - North Nowra entry through Illaroo Road.
- Ensure that required sight lines for motorists are not obscured by planting and revegetation areas
- Consider CPTED (Crime Prevention Through Environmental Design) principles in the planting design adjacent to pedestrian and shared use paths
- Vegetate all areas affected by the work
- Vegetate fill embankments and cut batters to stabilise the earthwork, minimise their visual impact and integrate them with the character of the surrounding landscape.

At the detailed design stage, which would include further refinement of the plant species selection, particular consideration should be made for ongoing maintenance requirements. Principles include:

- Selection of plant species are to be robust, non-invasive and not fire promoting
- Use of local provenance plant material for native revegetation plantings
- Exclusion of all species identified as noxious or local weeds
- Placement and species selection for planting within the road corridor, including in medians and verges, to be in accordance with clear zone and sight stopping distance requirements
- Minimise ongoing maintenance requirements.

LANDSCAPE STRATEGIES

Based on the site analysis of existing landscape character zones, and consideration of the design objectives, three key landscape strategies are proposed.

1. Provision of a well-vegetated road corridor along the Princes Highway

With the exception of the riparian corridors, which retain native plant communities, the areas adjoining the Princes Highway have been highly modified and present a mixture of urban and agricultural character. The existing vegetation is typically comprised of a tree canopy dominated by native species with a turf understorey. Grasses and shrubs are also present in the vicinity of Bomaderry Creek and Shoalhaven River as well as delimiting undeveloped lots at both the northern and southern end of the proposal.

The proposal would reinstate the tree canopy where disturbed by the works, to re-establish a well-planted road corridor with suitable landscape treatments along the Princes Highway.

Native species would be complemented with exotic trees to enhance the identity and legibility of particular areas.

In open spaces and areas adjacent to pedestrian and shared use paths, where CPTED principles are important and clear lines of sight are recommended for visual connection and passive surveillance, the understorey would be characterised by low growing ground covers and grasses or turf. Canopy trees would have no low growing branches in these areas.

Low shrubs and grasses would be planted on new batters in the areas with a more rural character, as well as along the new section of Pleasant Way.

All areas disturbed along the Bomaderry Creek and Shoalhaven River would be reinstated with native riparian species to retain the visual and ecological continuity of the riparian corridor.

Median planting would be provided, where appropriate, to visually reduce the scale of the road corridor and contribute to more urban character. Grasses and groundcovers are proposed for medians, complemented with low shrubs. Small-scale trees (Max 2m) are proposed for the widest sections of the median south of the bridge to achieve a boulevard character.

2. Feature planting

The native species would be complemented with formalised planting of exotic trees along both sides of the traffic lanes leading to the bridges. These feature trees would be arranged in a single line on either side of the road with a background of native trees, where enough space is available.

The formal planting arrangement would extend through Illaroo Road and Bridge Road at their intersections with the Princes Highway to announce the access to North Nowra and Nowra CBD respectively.

Additionally, at the intersection of Bridge Road and Princes Highway, a terraced landscape with a formal planting of accent grasses and low shrubs would be also provided. Formal planting of exotic trees on each side and a feature planting of Fig trees on the background would lead the drivers' view towards the Nowra signage, creating a gateway to Nowra CBD.

3. Retain and enhance existing open space

The existing open spaces interfacing the road upgrade are comprised mostly of open lawn areas with clusters of native trees. The proposed planting would maintain this character, protecting and retaining existing trees where possible, and reinforcing them with additional planting of native trees.

Areas of turf would be reinstated where disturbed.

Groundcovers and grasses would be planted on the new batters at Rotary Park, where the slope is too steep for mowing.

The existing residential properties at the northern side of Illaroo Road that would be acquired, present an opportunity for a potential extension of Rotary Park. Consistently with other areas, lawn would be applied to this new open space where the topography is relatively flat. Informal planting of native trees with an understorey of low shrubs is proposed for the new batters that are not suitable for mowing.

The existing road pavement on the Princes Highway approaching the heritage bridge, which would be no longer required for vehicular traffic, would be transformed into a new open space with lawn areas and informal planting of native trees, with a character consistent with the rest of the proposal. A formal row of exotic trees would be planted adjacent to the Princes Highway.

PROPOSED PLANT PALETTE

To achieve consistency with the existing character of the study area, an indicative selection of plant species is provided. The proposed plant species are summarised in the next pages. A recommended list of plant species for the Shoalhaven LGA has been reviewed in the preparation of these indicative plant lists.

NATIVE TREES

| | BOTANICAL NAME | COMMON NAME | MATURE HEIGHT |
|--------------------------|-------------------------------------|----------------------|---------------|
| 1 | <i>Corymbia maculata</i> | Spotted Gum | up to 45 m |
| 2 | <i>Eucalyptus pilularis</i> | Blackbutt | 15-30 m |
| 3 | <i>Eucalyptus paniculata</i> | Grey Ironbark | 15-30 m |
| 4 | <i>Syncarpia glomulifera</i> | Turpentine | 15-25 m |
| 5 | <i>Brachychiton acerifolius</i> | Illawarra flame tree | 30 m |
| 6 | <i>Callistemon salignus</i> | Willow Bottlebrush | 3-10 m |
| 7 | <i>Cupaniopsis anacardioides</i> | Tuckeroo | 5-8 m |
| 8 | <i>Ficus rubiginosa</i> | Port Jackson fig | up to 30 m |
| 9 | <i>Livistona australis</i> | Cabbage palm | 25 m |
| RIPARIAN PLANTING | | | |
| 10 | <i>Allocasuarina cunninghamiana</i> | Sheoak | 12 m |



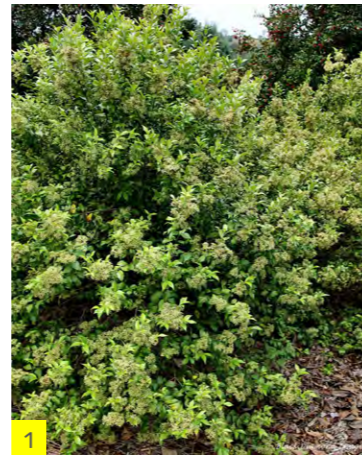
FEATURE TREES

| | BOTANICAL NAME | COMMON NAME | MATURE HEIGHT |
|-----------------------------------|----------------------------------|-----------------------|---------------|
| NORTH NOWRA | | | |
| 1 | <i>Liriodendron tulipifera</i> | Tulip tree | 15-30 m |
| 2 | <i>Prunus cerasifera 'Nigra'</i> | Single flowering Plum | 5 m |
| SOUTH NOWRA | | | |
| 3 | <i>Zelkova serrata</i> | Japanese Elm | 10-20 m |
| 4 | <i>Pistacia chinensis</i> | Pistacia | 15-20 m |
| NOWRA CBD GATEWAY PLANTING | | | |
| 5 | <i>Ficus macrophylla</i> | Moreton Bay Fig | 20-50 m |



SHRUBS

| | BOTANICAL NAME | COMMON NAME | MATURE HEIGHT |
|---|--------------------------------|-------------------|---------------|
| 1 | <i>Backhousia myrtifolia</i> | Grey Myrtle | 3m |
| 2 | <i>Banksia spinulosa</i> | Hairpin Banksia | 1-3 m |
| 3 | <i>Elaeocarpus reticulatus</i> | Blueberry Ash | 3-15 m |
| 4 | <i>Kunzea ambigua</i> | White Kunzea | 2-3 m |
| 5 | <i>Syzygium australe</i> | Creek Lilly Pilly | 1-6 m |
| 6 | <i>Tristaniopsis laurina</i> | Water Gum | 5-15 m |



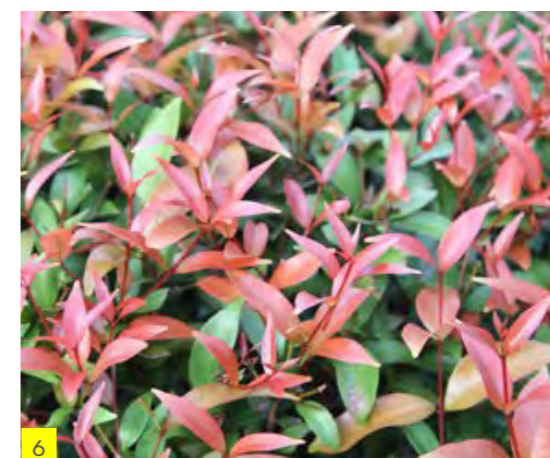
GRASSES AND GROUNDCOVERS

| | BOTANICAL NAME | COMMON NAME | MATURE HEIGHT |
|---|--|------------------------|---------------|
| 1 | <i>Pratia purpurascens</i> | Whiteroot | 0.3 m |
| 2 | <i>Dichandra repens</i> | Kidney Weed | |
| 3 | <i>Dianella longifolia</i> | Blueberry Lily | 0.8 m |
| 4 | <i>Dianella revoluta</i> | Blueberry Lily | 1 m |
| 5 | <i>Lomandra longifolia</i> | Lomandra | 0.5-1 m |
| 6 | <i>Lomandra multiflora subsp. multiflora</i> | Many-flowered Mat-rush | 0.5-1 m |
| 7 | <i>Themeda australis</i> | Kangaroo grass | 1.2 m |



NOWRA CBD GATEWAY

| | BOTANICAL NAME | COMMON NAME | MATURE HEIGHT |
|---|---|---------------------|---------------|
| 1 | <i>Anigozanthos hybrid 'Amber Velvet'</i> | Kangaroo paw | 0.5 m |
| 2 | <i>Doryanthes excelsa</i> | Gynea lily | 1 m |
| 3 | <i>Gazania tomentosa</i> | Silver gazania | 0.3 m |
| 4 | <i>Liriope muscari</i> | Blue lilyturf | 0.6 m |
| 5 | <i>Lomandra longifolia 'Tanika'</i> | Spiny-head Mat-rush | 0.6 m |
| 6 | <i>Syzygium australe 'Bush Christmas'</i> | Lilly pilly | 2-3 m |



Chapter 5

LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT

5.1 INTRODUCTION

This section of the report aims to review and define the various landscape characters and viewpoints along the road corridor and assess the visual impacts of the proposal on the community and landscape of the area.

The *Environmental Impact Assessment Practice Note: Guidelines for Landscape Character and Visual Impact Assessment* ("EIA No. 4 Guidelines", March 2013, RMS) sets out two main purposes of landscape character and visual impact assessment:

"To inform the development of the preferred route and concept design so that the proposal can avoid and minimise impacts up front..."

"To inform RMS, other agencies and the community about the landscape character and visual impact of the proposal and what avoidance, management and mitigation strategies would be implemented."

The EIA No.4 Guidelines describe the landscape character assessment and visual impact assessment as follows:

"Landscape character and visual assessment are equally important. Landscape character assessment helps determine the overall impact of a project on an area's character and sense of place. Visual impact assessment helps define the day-to-day visual effects of a project on people's views.

This dual assessment helps differentiate options, improve route alignment decisions and improve design outcomes.

Landscape character assessment sums up an area's sense of place including all built, natural and cultural aspects, covering towns, countryside and all shades between. Visual assessment addresses people's views of an area from their homes or other places of value in the community."

5.2 METHODOLOGY

The impact assessment methodology adopted in the assessment of the proposal is defined in the Practice Note (RMS, 2013).

The assessment of landscape character involves the identification of the different landscape character zones within the proposal area (discussed in detail in section 5.3), a description of their defining attributes and an assessment of the sensitivity and impact of the proposal on each zone.

The assessment of visual impact requires the selection of a number of viewpoints along the proposal. A description of the selected viewpoint and assessment of the sensitivity and impact of the proposal, in terms of magnitude is then carried out. The ratings for sensitivity and magnitude and the overall rating is based on the rating assessment proposed in the RMS Practice Note (See Table 2).

When assessing the magnitude of this proposal, a conservative clearing boundary has been assumed. The assessment of impact is carried out generally based on the first five years from the opening of the road. It should be noted that impacts would reduce in rating as the vegetation matures over time.

Table 2. Landscape character and visual impact grading matrix

| | | MAGNITUDE | | | |
|-------------|------------|---------------|----------------|----------------|------------|
| | | High | Moderate | Low | Negligible |
| SENSITIVITY | High | High | High-moderate | Moderate | Negligible |
| | Moderate | High-moderate | Moderate | Moderate - low | Negligible |
| | Low | Moderate | Moderate - low | Low | Negligible |
| | Negligible | Negligible | Negligible | Negligible | Negligible |
| | Negligible | Negligible | Negligible | Negligible | Negligible |

Source: EIA No. 4 Guidelines, 2013

5.3 LANDSCAPE CHARACTER ASSESSMENT

This section of the report reviews the physical attributes, which define the character zones of the study area and the potential impacts of the proposal on these. The character of an area is defined by a number of elements in this case predominantly landform, land-use and vegetation cover.

The proposal covers six character zones:

- Character Zone 1 – Rural/Regional Park
- Character Zone 2 – Illaroo Road Residential
- Character Zone 3 – Shoalhaven River Waterbody
- Character Zone 4 – River Foreshore – South
- Character Zone 5 – Nowra Town Entry
- Character Zone 6 – Nowra Multi-use.

These are depicted in the Figure 66.

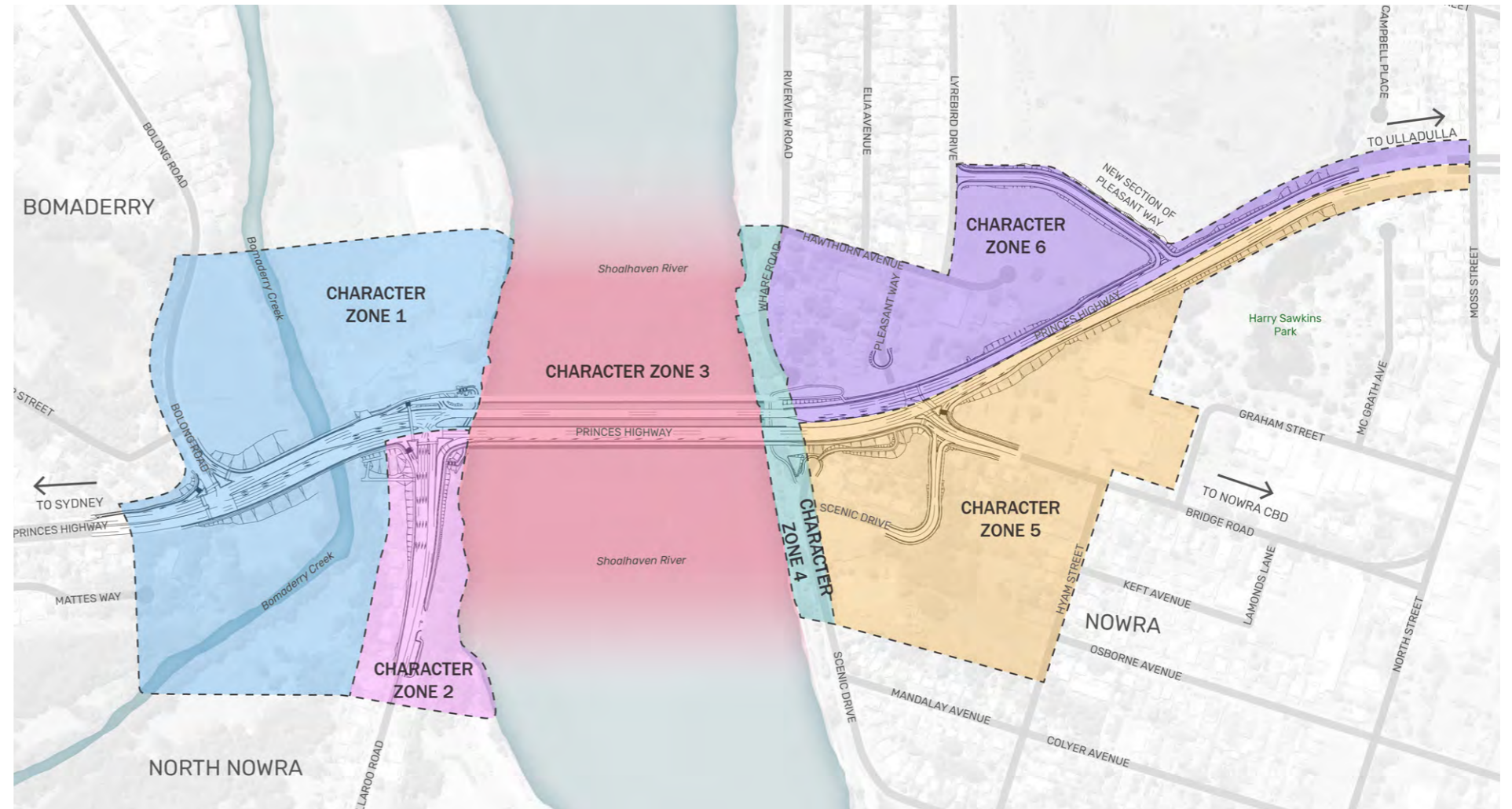


Figure 66. Character Zones

- KEY**
- Character Zone 1 - Rural/Regional Park
 - Character Zone 2 - Illaroo Road residential
 - Character Zone 3 - Shoalhaven River waterbody
 - Character Zone 4 - Riverfront open space - south
 - Character Zone 5 - Nowra town entry
 - Character Zone 6 - Nowra multi-use

Landscape Character Zone 1 – Rural/Regional Park

Description: This character zone includes the areas east of the Princes Highway between the Shoalhaven River and Bolong Road and Bomaderry Creek and its associated vegetated corridor west of the Princes Highway (Figure 67). Bomaderry Creek runs through the centre of the zone. The topography is generally flat.

The built form is comprised of commercial and residential properties on the western side of the Princes Highway. There are two areas of agricultural land to the rear of these properties, separated by Bomaderry Creek. To the west of the Princes Highway, Bomaderry Creek continues northeast on Crown Land towards Bomaderry Regional Park. This area is densely vegetated with mature trees.

Sensitivity: This character zone is primarily open space with residential dwellings and commercial properties fronting the Princes Highway. The sensitivity to change has therefore been assessed as **moderate**.

Magnitude: The proposal introduces a number of changes to this character zone which include:

- Upgrade of the bridge approaches generally between Bolong Road on the northern side and Moss Street on the southern side
- Widening of the existing bridge over Bomaderry Creek to the west (upstream)
- Removal of traffic from the old southbound bridge and works to provide pedestrian and cycle access
- Upgrading of the Princes Highway to provide three northbound and three southbound lanes from Bolong Road through to about 75 metres north of Moss Street
- Upgrading of the Princes Highway and Illaroo Road intersection to provide two southbound right turn lanes from the Princes Highway into Illaroo Road
- Provision of pedestrian facilities at all intersections
- Urban design and social amenity improvements and landscaping, including foreshore pedestrian links to the existing southbound bridge

- Relocation and/or protection of utility services within the affected road corridor
- Drainage and water quality management infrastructure along the road corridor
- Property works including acquisition, demolition, and adjustments to accesses
- Temporary ancillary facilities during construction including site offices, construction compounds, and stockpile sites.

The proposed works would increase the width of the Princes Highway on both the east and west sides, including the widening of Bomaderry Creek bridge. This widening and its associated embankments would impact the character of this area through the removal of existing rows of trees on both sides of the Princes Highway, north of Bomaderry Creek. The removal of the trees would impact the screening of the road to and from nearby properties, as well as impacting on the drivers' experience travelling through this area. The proposed works involve the upgrade of an existing highway, however, the character of the area is considered to be significantly changed as a result of the associated earthworks. The changes to this landscape character therefore result in the magnitude being assessed as **high**.

Assessment of Impact: The combination of the sensitivity of the character zone and the magnitude of the proposed change provide an integrated landscape character impact of **high-moderate**.

Note: The overall impact would be reduced over time as the proposed planting matures.



Figure 67. Pastoral land east of the Princes Highway with Bolong Road on left of view

Landscape Character Zone 2 – Illaroo Road Residential

Description: This character zone is located north of the Shoalhaven River and immediately west of the Princes Highway. The built form is characterised by a single row of residential dwellings on the northern side of Illaroo Road (Figure 68), separated from the riverfront by Rotary Park. The topography slopes down Illaroo Road, east towards the Princes Highway. Rotary Park is highly visible from the southern bank of the river and while crossing the existing Nowra Bridge. There is a walkway beneath both bridge structures that connects to the eastern side of the bridge. Mature vegetation throughout the park screens the road and the properties on Illaroo Road from view.

Sensitivity: The predominant land use within this character zone is residential. The built form faces the roadway and is set back a short distance with turfed front gardens and minimal screening. Rotary Park sits between Illaroo Road and the Shoalhaven River. The park includes mature trees and provides views to and from the bridge. The sensitivity to change has therefore been assessed as **high**.

Magnitude: The proposal introduces a number of changes to this character zone which include:

- Four northbound lanes including a dedicated left turn only lane from Bridge Road to Illaroo Road
- A 3.5 metre wide shared use path on the western side of the bridge connecting the Illaroo Road intersection to the Bridge Road intersection
- Widening of Illaroo Road over a distance of about 340 metres
- Upgrading of the Princes Highway and Illaroo Road intersection to provide:
 - Two southbound right turn lanes from the Princes Highway into Illaroo Road
 - Two dedicated right turn lanes and one right and left turn lane from Illaroo Road to the Princes Highway.
- Provision of pedestrian facilities at all intersections
- Dedicated off road shared use paths and footpaths along the length of the proposal

- Urban design and social amenity improvements and landscaping including foreshore pedestrian links to the truss bridge
- Relocation and/or protection of utility services within the affected road corridor
- Drainage and water quality management infrastructure along the road corridor
- Property works including acquisition, demolition and adjustments to accesses
- Temporary ancillary facilities during construction including site offices, construction compounds, and stockpile sites.

The scale of the proposal would increase the width of the carriageway to the northern side of Illaroo Road requiring the acquisition of a number of properties. These properties have frontages to Illaroo Road and following removal would change the character of the road as well as the residential precinct. The proposal would also increase the width of Illaroo Road on the southern side, impacting on Rotary Park. The new northbound bridge, along with the increased width of Illaroo Road and removal of a number of mature trees, would impact the existing character of the park. The landscape character of the area would be significantly changed due to the proposal. The changes to this landscape character therefore result in the magnitude being assessed as **high**.

Assessment of Impact: The combination of the sensitivity of the character zone and the magnitude of the proposed change provide an integrated landscape character impact of **high**.



Figure 68. Typical residential dwellings on Illaroo Road

Landscape Character Zone 3 – Shoalhaven River Waterbody

Description: This character zone includes the Shoalhaven River and the existing bridge structures that cross it. The Shoalhaven River is the predominant visual element in the landscape with a distinctive character defined by its wide sweeping form, cutting through the low-lying topography. It has a scenic character that is a combination of the horizontal water plane, the rivers edge vegetation and distant views to the hills and ranges beyond. The existing southbound and northbound bridge structures are dominant visual elements within the character zone, easily viewed from the foreshores and from the river (Figure 69).

Sensitivity: This character zone is highly visible from the foreshores and the river. The sensitivity to change has therefore been assessed as **high**.

Magnitude: The proposal introduces a number of changes to this character zone which include:

- Construction of a new northbound bridge to the west (upstream) of the existing bridge crossings over the Shoalhaven River
- Four northbound lanes including a dedicated left turn only lane from Bridge Road to Illaroo Road
- A 3.5 metre wide shared use path on the western side of the bridge connecting the Illaroo Road intersection to the Bridge Road intersection
- Minor lane adjustments on the existing northbound bridge to convert it to three lanes of southbound traffic
- Removal of traffic from the existing southbound bridge and works to provide pedestrian and cycle access
- Relocation and/or protection of utility services within the affected road corridor
- Drainage and water quality management infrastructure along the road corridor
- Temporary ancillary facilities during construction including site offices, construction compounds, and stockpile sites.

The proposed works include the construction of a new northbound bridge, which together with the existing bridge, increase the scale of infrastructure on the river setting and would be particularly visible from the upstream side. The design of the pier locations and the level of the bridge deck would mitigate the impacts, aligning with the existing bridge structures.

Overall, the qualitative assessment indicates that the magnitude of the project would be **moderate** on the upstream side and **low** on the downstream side due to the proposed changes taking place.

Assessment of Impact: The combination of the sensitivity of the character zone and the magnitude of the proposed change provides an integrated landscape character impact of **high-moderate**.



Figure 69. Shoalhaven River and Nowra Bridge from the southern foreshore

Landscape Character Zone 4 – River Foreshore – South

Description: This character zone covers the open space that runs along the southern river foreshore (Figure 70). The landform slopes towards the water's edge, with open lawn areas and clusters of mature trees dominating the character. Flood levees to the east of the bridge provide a ridgeline, on which Bens Walk runs. Bens Walk, an east-west pedestrian and cycle path stretches the length of the character zone, passing beneath both existing bridge structures. Wharf Road Restaurant and Bar, as well as Shoalhaven River Cruise and a wakeboarding school are located immediately east of the bridge.

Sensitivity: This character zone is predominantly open space with a number of commercial buildings to the east of the bridge. The large area of open space adjacent to the western side of the bridge has mature trees that provide a parkland character to the area, with clear views to and from the river and to and from the existing bridge. The sensitivity to change has therefore been assessed as **high**.

Magnitude: The proposal introduces a number of changes to this character zone which include:

- Construction of a new northbound bridge to the west (upstream) of the existing bridge crossings over the Shoalhaven River
- Dedicated off road shared use paths and footpaths along the length of the proposal
- Urban design and social amenity improvements and landscaping, including foreshore pedestrian links to the existing truss bridge
- Relocation and/or protection of utility services within the affected road corridor
- Drainage and water quality management infrastructure along the road corridor
- Temporary ancillary facilities during construction including site offices, construction compounds, and stockpile sites.

The construction of the new northbound bridge to the west of the existing bridge crossing would increase the scale of infrastructure within the southern foreshore. The additional crossing would remove a number of mature trees west of the existing bridge that contribute to the parkland character of the character zone. Bens Walk, which runs the length of the character zone and under the existing bridge structures, would now pass beneath an additional structure increasing the perceived separation of east from west.

The changes to this landscape character therefore result in the magnitude being assessed as **moderate**.

Assessment of Impact: The combination of the sensitivity of the character zone and the magnitude of the proposed change provide an integrated landscape character impact of **high-moderate**.



Figure 70. Foreshore open space looking east towards the existing bridge structures

Landscape Character Zone 5 – Nowra Town Entry

Description: This character zone spans the area west of the Princes Highway between the southern extent of the proposal and Scenic Drive. It is largely characterised by a mix of single and two storey commercial buildings with a number of residential dwellings distributed throughout. The topography is relatively flat, with the land sloping gently towards the river. The vegetation contains informal plantings of single, avenue and clustered mature trees, many of which are mature Eucalyptus species over 20 metres tall (Figure 71). The open space and vegetation to the north of the character zone fronts LCZ4 and has a parkland character allowing views through to the river.

The built form within LCZ5 is generally set back from the Princes Highway. There are views to the corridor from a number of adjacent dwellings, however some of the mature vegetation currently screens sightlines.

Sensitivity: This precinct is comprised of primarily civic and commercial properties that address the highway, with many having a reasonable offset from the existing roadway. Roadside verges are narrow and predominantly planted with trees and shrubs. Screening of the road is dependant of this narrow avenue of planting. The character zone sensitivity to change has therefore been assessed as **high**.



Figure 71. Clusters of mature trees adjacent to the Princes Highway looking north

Magnitude: The proposal introduces a number of changes to this character zone which include:

- Upgrade of the southern bridge approach between the Shoalhaven River and Moss Street
- A 3.5 metre wide shared use path on the western side of the bridge connecting the Illaroo Road intersection to the Bridge Road intersection
- Upgrading of the Princes Highway to provide three northbound and three southbound lanes through to about 75 metres north of Moss Street
- Upgrading of the Princes Highway and Bridge Road intersection to provide:
 - Two southbound right turn lanes from the Princes Highway into Bridge Road
 - One left turn lane from Bridge Road to the Princes Highway.
- Local road adjustments including restricting turning movements at the intersection of Bridge Road and Scenic Drive
- Provision of pedestrian facilities at all intersections

- Dedicated off road shared use paths and footpaths along the length of the proposal
- Urban design and social amenity improvements and landscaping, including foreshore pedestrian links to the existing southbound bridge
- Relocation and/or protection of utility services within the affected road corridor
- Drainage and water quality management infrastructure along the road corridor
- Temporary ancillary facilities during construction including site offices, construction compounds, and stockpile sites.

The proposal would transform the landscape character through the removal of large areas of vegetation on the western side of the Princes Highway. The Captain Cook Bicentennial Memorial west of the Princes Highway would also be removed. The avenue of mature trees that screen the Princes Highway from Harry Sawkins Park and the Shoalhaven Council building would be removed, as well as the large area of mature trees near the Riverhaven Motel. The upgrade of the Princes Highway and Bridge Road intersection would also materially change the character of the area, resulting in a considerable increase in the road width. The proposal would change the spatial quality of the area and impact on views for both motorists on the Princes Highway and also local roads including Bridge Road and the new section of Pleasant Way in LCZ6. The changes to this landscape character therefore results in the magnitude being assessed as **high**. It should be noted that the rating would reduce over time as the proposed trees and shrubs mature.

Assessment of Impact: The combination of the sensitivity of the character zone and the magnitude of the proposed change provide an integrated landscape character impact of **high**.

Landscape Character Zone 6 – Nowra Multi-use

Description: Character Zone 6 lies east of the Princes Highway and runs from the southern extent of the proposal to Wharf Road. The zone has primarily commercial and tourist uses with several residential dwellings to the south. Nowra Steakhouse and Café, East Willows Van Park and Pleasant Way River Lodge sit to the north of the character zone (Figure 72). The topography throughout the precinct is relatively flat, although the highway slopes up to higher ground on approach to the bridge. Vegetation within the character zone is comprised of a number of scattered trees throughout the campgrounds as well as a narrow avenue of trees lining the Princes Highway to the south.

Sensitivity: This character zone is predominantly commercial and tourism use, on relatively flat land below the highway. An avenue of vegetation screens a large area of agricultural land to south. The sensitivity to change has therefore been assessed as **moderate**.

Magnitude: The proposal introduces a number of changes to this character zone which include:

- Upgrade of the southern bridge approach between the Shoalhaven River and Moss Street
- Upgrading of the Princes Highway to provide three northbound and three southbound lanes through to about 75 metres north of Moss Street
- Local road adjustments including closing the access between Pleasant Way and the Princes Highway
- Construction of a new local road connecting Lyrebird Drive to the Princes Highway, about 300 metres south of the existing Pleasant Way intersection
- Provision of pedestrian facilities at all intersections
- Dedicated off road shared use paths and footpaths along the length of the proposal

- Urban design and social amenity improvements and landscaping, including foreshore pedestrian links to the existing truss bridge
- Relocation and/or protection of utility services within the affected road corridor
- Drainage and water quality management infrastructure along the road corridor.

The scale of change of the highway through this character zone is similar to that of LCZ5. The increased width of the road due to additional traffic lanes, for both northbound and southbound traffic, as well as the upgrade of the Princes Highway and Bridge Road intersection, would increase the dominance of the road infrastructure on approach to the bridge. The closing of the access to Pleasant Way would provide an opportunity to maintain a continuous pedestrian and cycle link from the existing southbound bridge to Nowra CBD. Extensive planting proposed would soften the extent of paving in this area and give visual queues to traffic approaching the bridge. The construction of a new local road connecting Lyrebird Drive to the Princes Highway will provide access to the precinct.

The removal of a number of trees south of the intersection along the eastern side of the Princes Highway would reduce the amount of screening to nearby properties as well as the proposed regional park. The changes to this landscape character therefore result in the magnitude being assessed as **high**. It should be noted that the rating would reduce over time as the proposed trees and shrubs mature.

Assessment of Impact: The combination of the sensitivity of the character zone and the magnitude of the proposed change provide an integrated landscape character impact of **high-moderate**.

5.3.1 SUMMARY OF CHARACTER ZONE IMPACTS

Table 3. Summary of Landscape Character Zone impacts table

| CHARACTER ZONE | SENSITIVITY | MAGNITUDE | IMPACT RATING |
|------------------------------------|-------------|-----------|-----------------|
| LCZ 1 - Rural/Regional Park | Moderate | High | High - Moderate |
| LCZ 2 - Illaroo Road Residential | High | High | High |
| LCZ 3 - Shoalhaven River Waterbody | High | Moderate | High - Moderate |
| LCZ 4 - River Foreshore - South | High | Moderate | High - Moderate |
| LCZ 5 - Nowra Town Entry | High | High | High |
| LCZ 6 - Nowra Multi-use | Moderate | High | High - Moderate |



Figure 72. View from the Princes Highway looking east towards East Willows Van Park

5.4 VISUAL IMPACT ASSESSMENT

VISIBILITY OF THE PROPOSAL

The visibility of the proposal is illustrated in the Visual Envelope Map (VEM) (Figure 73). The visibility

5.4.1 IDENTIFICATION OF VIEW POINTS

Three of the selected viewpoints are illustrated as photomontages that show the view as it is currently (before) and the view including the proposal (after). One view is illustrated twice, showing both bridge options (Launched Box Girder and Super-T). Seven viewpoints are not illustrated with photomontages, however are discussed below.

Viewpoints illustrated in photomontage are:

- Viewpoint 1 - Looking south along the Princes Highway towards Bolong Road
- Viewpoint 6 - Looking northeast from the southern foreshore towards Nowra Bridge
- Viewpoint 8 - Looking south from the Princes Highway towards Bridge Road Intersection.

Viewpoints not illustrated are:

- Viewpoint 2 - Looking south along the Princes Highway towards Illaroo Road
- Viewpoint 3 - Looking east along Illaroo Road towards the Princes Highway
- Viewpoint 4 - Looking southeast from Rotary Park towards Nowra Bridge
- Viewpoint 5 - Looking northwest from the northern foreshore towards Nowra Bridge
- Viewpoint 7 - Looking northwest from the southern foreshore towards Nowra Bridge
- Viewpoint 9 - Looking north from the corner of Bridge Road and the Princes Highway
- Viewpoint 10 - Looking north along the Princes Highway.

KEY

- Primary visual envelope
- Secondary visual envelope
- Viewpoints - Illustrated in photomontage
- Viewpoints - Not Illustrated

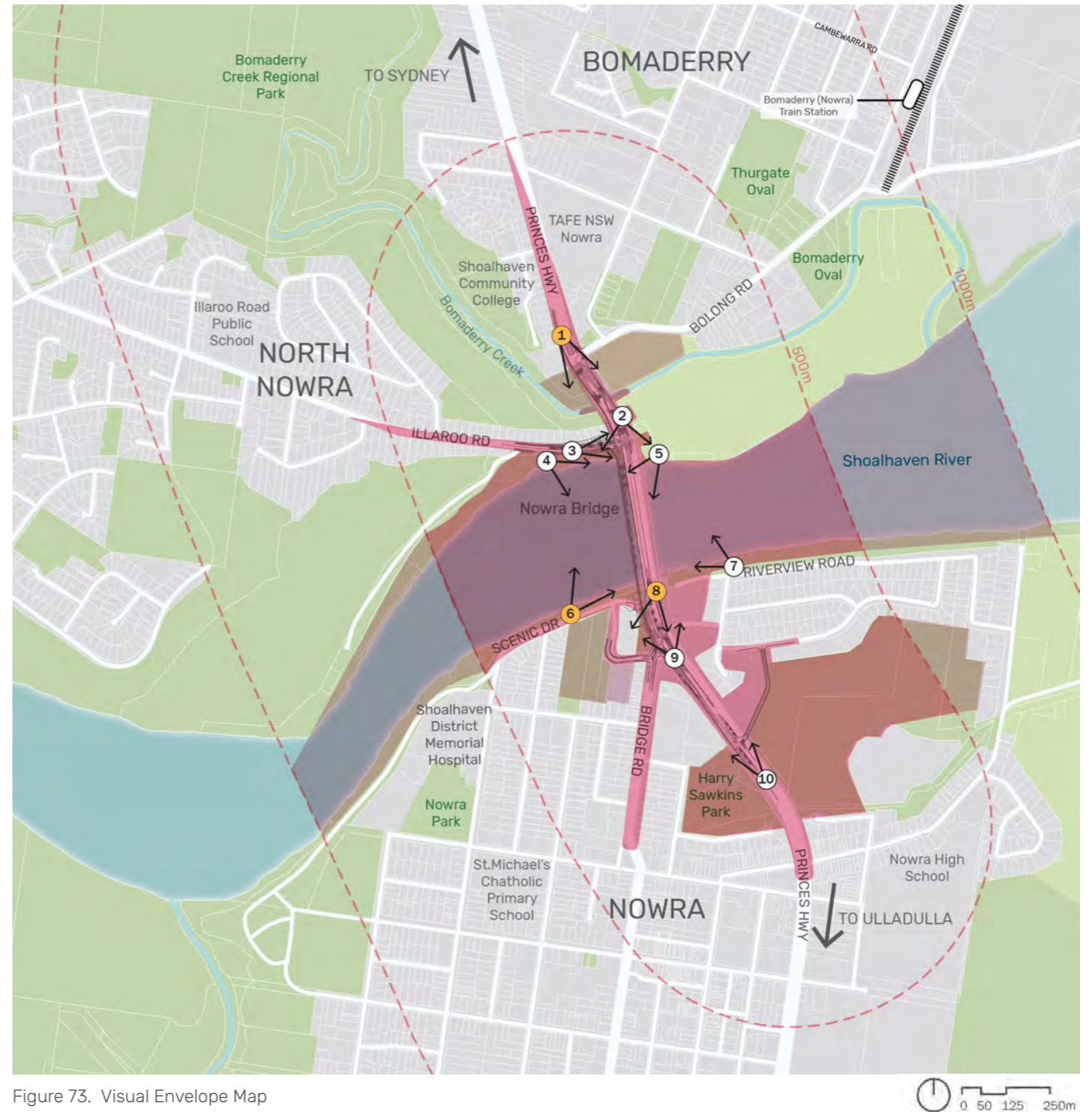


Figure 73. Visual Envelope Map

5.4.2 ASSESSMENT OF SELECTED VIEWPOINTS

VIEWPOINT 1 - LOOKING SOUTH ALONG THE PRINCES HIGHWAY TOWARDS BOLONG ROAD

Description: This view is from the Princes Highway looking south along the highway corridor (Figure 74). The residential properties that face Mattes Way and Brinawarr Street are separated from the highway by a rear fence and cannot be seen from this view. There is a footpath on the left of view and a raised footpath on the right of view. The topography descends with the Princes Highway towards the Shoalhaven River. An avenue of mature vegetation lines the highway on either side of the road.

Sensitivity: Southbound motorists approaching Nowra Bridge would experience this view. Despite the attractive and mature vegetation on either side of the road, the sensitivity of the viewer is considered to be **moderate** due to their focus being on the road.

Magnitude: As part of the proposal the Princes Highway would be widened to include three northbound lanes and three southbound lanes. The works would include a wider median and reinstate the existing footway on the right of view. As a result of earthworks, the existing avenue of mature trees would be removed on either side of the road. These trees will be reinstated. The trees will contribute to the character of this view, however will take 10 - 15 years to mature. Due to the increased pavement area and removal of vegetation the magnitude of these changes are therefore considered to be **moderate**.

Assessment of Impact: The combination of the sensitivity of the viewpoint and the magnitude of the proposal on the view provides an impact of **moderate**. The impact would be reduced over time as the proposed planting matures.



Figure 74. Viewpoint 1 looking south along the Princes Highway towards Bolong Road- Existing



Figure 75. Viewpoint 1 looking south along the Princes Highway towards Bolong Road - Proposal showing planting at road opening



Figure 76. Viewpoint 1 looking south along the Princes Highway towards Bolong Road - Proposal showing mature planting at approximately 10-15 years after road opening

VIEWPOINT 2 - LOOKING SOUTH ALONG THE PRINCES HIGHWAY TOWARDS ILLAROO ROAD

Description: This view is from the Princes Highway looking southwest on approach to Nowra Bridge (Figure 77). The Illaroo Road intersection is in the foreground with the bridge in the background. The topography is flat. Rotary Park can be seen on the right of the view at the corner of Illaroo Road and the Princes Highway.

Sensitivity: Southbound motorists from the Princes Highway experience this view. The bridge is within view, as well as Rotary Park. The view is amidst a busy interchange resulting in the sensitivity being assessed as **moderate**.

Magnitude: The proposed works would realign the Princes Highway and Illaroo Road intersection. The Princes Highway would be widened to include three southbound lanes crossing the existing northbound bridge with two dedicated right turn lanes onto Illaroo Road. A new median would be introduced and a left slip lane to the Perfect Catch Seafood takeaway property not in view. The new northbound bridge would be introduced on the right of view, impacting on Rotary Park as well as requiring the acquisition of properties on Illaroo Road. Due to the increased pavement area, the introduction of the new northbound bridge and the impact on Rotary Park the magnitude of these changes are therefore considered to be **high**.

Assessment of Impact: The combination of the sensitivity of the viewpoint and the magnitude of the proposal on the view provides an impact of **high-moderate**.

VIEWPOINT 3 - LOOKING EAST ALONG ILLAROO ROAD TOWARDS THE PRINCES HIGHWAY

Description: This view is from Illaroo Road looking east towards the Princes Highway and Illaroo Road intersection (Figure 78). The topography descends with Illaroo Road towards the Princes Highway. Rotary Park with its established vegetation and pedestrian paths is on the right of view.

Sensitivity: Primarily local residents and motorists would experience this view. The proximity of the residential dwellings, as well as Rotary Park with its predominantly native species, establishes a park character that contributes to the sensitivity being considered a **moderate**.

Magnitude: The proposed works would widen Illaroo Road to include three dedicated right turn lanes and one dedicated left turn lane from Illaroo Road to the Princes Highway. Two westbound lanes from the Princes Highway as well as a slip lane from the new northbound bridge would be introduced. A 3.5 metre wide shared use path on the western side of the new northbound bridge would continue west up Illaroo Road. The project earthworks would require the acquisition of a number of dwellings on the left of view. The new northbound bridge would be introduced on the right of view impacting on Rotary Park. A large area of the park including existing mature vegetation would be removed. Due to the increased road width, the introduction of the new northbound bridge and the impact on both Rotary Park and the properties on Illaroo Road the magnitude of these changes are therefore considered to be **high**.

Assessment of Impact: The combination of the sensitivity and the magnitude of the proposal results in an impact of **high-moderate**. The impact would be reduced over time as the proposed planting matures.



Figure 77. Viewpoint 2 looking southwest from the Princes Highway towards the proposed crossing
Source: www.google.com.au/maps

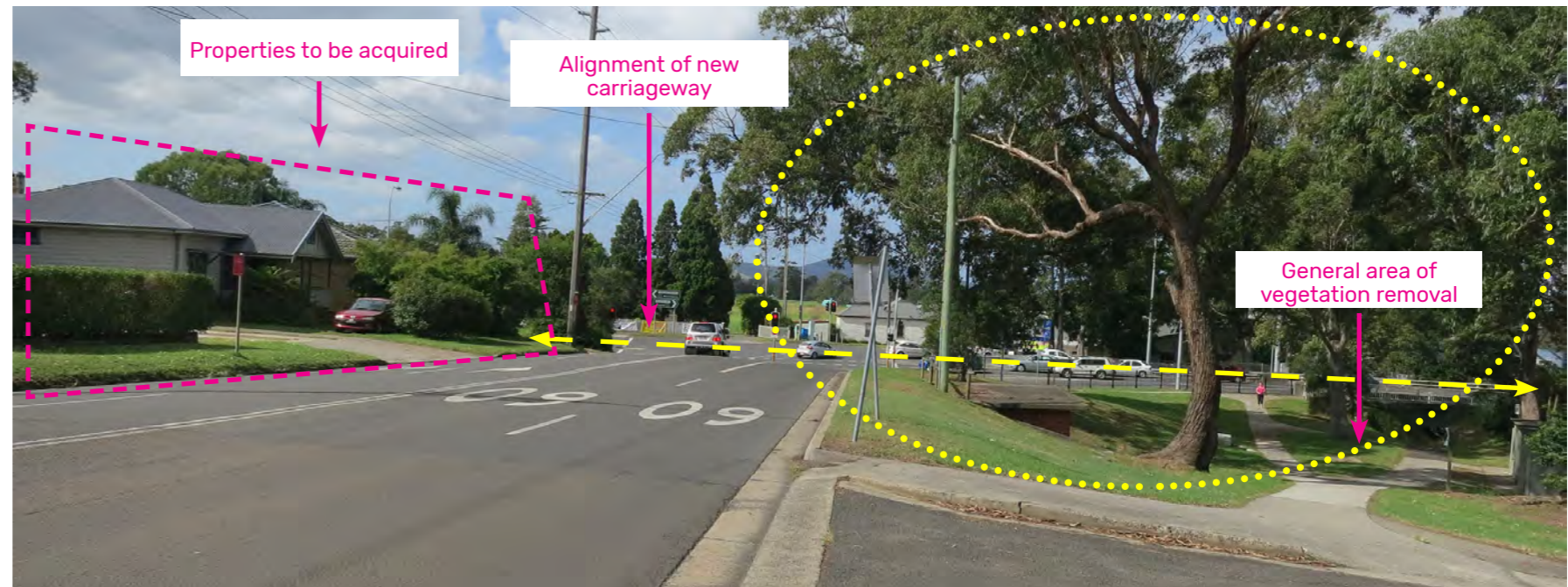


Figure 78. Viewpoint 3 looking east along Illaroo Road towards the Princes Highway

VIEWPOINT 4 - LOOKING SOUTHEAST FROM ROTARY PARK TOWARDS NOWRA BRIDGE

Description: This view is from Rotary Park looking southeast across the Shoalhaven River towards the bridge (Figure 79). The southern foreshore as well as both existing bridge structures is within view.

Sensitivity: Pedestrians and cyclists in Rotary Park experience this view. Pedestrians have been assessed to have **high** sensitivity as their attention is generally focussed on the river and its surrounds for reasonably long periods of time and in the direction of the new northbound and existing southbound and northbound bridges.

Magnitude: The new northbound bridge would be constructed in front of the existing bridge and would be highly visible from this location. All components of the bridge would be visible and would block the view to a large portion of the existing northbound bridge. This would also result in the loss of a number of trees on the southern bank of the river as well as the vegetation on the left of view. These trees however, would be replaced with similar species adjacent to the new northbound bridge. Due to the introduction of the new northbound bridge, and the impact on southern and northern foreshore the magnitude of these changes are therefore considered to be **high**.

Assessment of Impact: The combination of the sensitivity of the viewpoint and the magnitude of the proposal on the view provides an impact of **high**.

VIEWPOINT 5 - LOOKING NORTHWEST FROM THE NORTHERN FORESHORE TOWARDS NOWRA BRIDGE

Description: This view is from the perspective of the people using the open space to the rear of the fish and chip shop on the northern river foreshore. The view addresses the existing southbound heritage bridge in the foreground with the existing northbound bridge behind (Figure 80). Views are available across the river to the Wharf Road Restaurant and Bar, as well as through the bridge piers to the southern foreshore.

Sensitivity: Patrons of the fish and chip shop, as well as pedestrians have been assessed as having a **moderate** sensitivity. Despite their attention generally being focussed on the river, the existing bridge structures provide strong existing infrastructural elements within the view.

Magnitude: The new northbound bridge would be constructed on the upstream side of the existing northbound bridge. From this viewpoint, the new northbound bridge superstructure and barriers would be obscured by the both existing bridge structures. The elements of the bridge that would be visible include the piers and pile caps and part of the abutment on the southern foreshore. The new piers would limit views through to the southern foreshore. Due to the introduction of the new northbound bridge and the impact on southern foreshore views the magnitude of the changes are therefore considered to be **moderate**.

Assessment of Impact: The combination of the sensitivity of the viewpoint and the magnitude of the proposal on the view provides an impact of **moderate**.



Figure 79. Viewpoint 4 looking southeast from Rotary Park towards Nowra Bridge



Figure 80. Viewpoint 5 looking south-west from the northern foreshore towards Nowra Bridge

VIEWPOINT 6 - LOOKING NORTHEAST FROM THE SOUTHERN FORESHORE TOWARDS NOWRA BRIDGE

Description: This view is from the perspective of people using the open space on the southern river foreshore. It addresses foreground views of the proposal with the existing bridge structures behind (Figure 81).

Sensitivity: Local pedestrians and tourists visit this public park to observe the panoramic views over the river and in particular the view of the existing bridge structures. These viewers have been assessed as having a **high** sensitivity as this view has a high cultural significance. The view of the existing southbound bridge would almost be entirely obstructed by the new northbound bridge.

Magnitude: The new northbound bridge would be constructed in front of the existing northbound bridge and would be highly visible from this location. All components of the new northbound bridge would be visible and would block the view to a large portion of the existing concrete bridge. Views to the existing southbound bridge are already filtered substantially by the existing northbound bridge. The new piers would limit views through to the northern foreshore. Due to the introduction of the new northbound bridge and the impact on northern foreshore views the magnitude of the changes are therefore considered to be **moderate**.

Assessment of Impact: The combination of the sensitivity of the viewpoint and the magnitude of the proposal on the view provides an impact of **high-moderate**.



Figure 81. Viewpoint 6 looking north-east from the southern foreshore towards Nowra Bridge - Existing



Figure 82. Viewpoint 6 looking north-east from the southern foreshore towards Nowra Bridge - Proposed (Option 1)

The visual impact assessment for this Super-T design option varies from the box girder design option because of the contrasting and bulky pier design. The sensitivity remains **high** however the magnitude is potentially higher due to the piers bulky and contrasting form to the existing northbound bridge. While the magnitude does not change sufficiently to be rated as high, it is likely to have a higher visual impact than the box girder option. For this reason the box girder option is preferred to the Super-T option.



Figure 83. Viewpoint 6 looking north-east from the southern foreshore towards Nowra Bridge - Proposed (Option 2)

VIEWPOINT 7 - LOOKING NORTHWEST FROM THE SOUTHERN FORESHORE TOWARDS NOWRA BRIDGE

Description: This view is from the perspective of pedestrians and cyclists on Bens Walk and the open space on the southern river foreshore looking Northwest towards the heritage bridge (Figure 84).

Sensitivity: Local pedestrians and tourists visit this public park to observe the panoramic views over the river and in particular the view of the existing bridge structures. They have been assessed as having a **high** sensitivity.

Magnitude: The new northbound bridge would be constructed on the upstream side of the existing northbound bridge. The existing bridge structures from this location would obscure the new northbound bridge superstructure and barriers. The elements of the bridge that would be visible include the piers and pile caps and part of the abutment on the northern foreshore. Vegetation removed at the northern abutment would be seen. The new piers would limit views through to the northern foreshore. Due to the introduction of the new northbound bridge on the upstream side of the existing bridge structures and the impact on northern foreshore views the magnitude of the changes are therefore considered to be **low**.

Assessment of Impact: The combination of the sensitivity of the viewpoint and the magnitude of the proposal on the view provides an impact of **moderate**.



Figure 84. Viewpoint 7 looking north-west from the southern foreshore towards Nowra Bridge

VIEWPOINT 8 - LOOKING SOUTHWEST FROM THE PRINCES HIGHWAY TOWARDS BRIDGE ROAD INTERSECTION

Description: This view is from the perspective of pedestrians and cyclists looking southwest across the intersection onto Bridge Road (Figure 85). Mature vegetation fronting the former Riverhaven Motel is on the right of view and the open space fronting the Shoalhaven Council property is in the background.

Sensitivity: Pedestrians and cyclists looking across the Princes Highway and Bridge Road intersection looking southwest would experience this view. Despite the attractive established vegetation on the right of view, the sensitivity of the viewer is considered to be **moderate** due to their focus being on the road.

Magnitude: The intersection would be modified to a signalised T-intersection, closing the access to Pleasant Way. The intersection would increase in size with three southbound lanes and four northbound lanes, including a dedicated left turn only lane from Bridge Road to Illaroo Road. The intersection would also have two dedicated right turn lanes onto Bridge Road. To accommodate this, the majority of vegetation in the background would be removed. The vegetation in the foreground on the right would also be removed. The proposed alignment changes the spatial quality of this view to an expansive road corridor approximately 50 metres in width. A number of strategies have been proposed to help reduce the scale of the paved intersection including a planted median and reinstating the Nowra CBD town entry planting and signage. Vegetation would also be reinstated on the new embankment on the western side of the Princes Highway, which when mature would provide visual separation between the highway and properties on Scenic Drive. These changes result in the magnitude being assessed as **high**.

Assessment of Impact: The combination of the sensitivity of the viewpoint and the magnitude of the proposal on the view provides an impact of **high-moderate**.



Figure 85. Viewpoint 8 looking south from the Princes Highway towards Bridge Road Intersection - Existing



Figure 86. Viewpoint 8 looking south from the Princes Highway towards Bridge Road Intersection - Proposal showing planting at road opening



Figure 87. Viewpoint 8 looking south from the Princes Highway towards Bridge Road Intersection - Proposal showing mature planting at approximately 10-15 years after road opening

VIEWPOINT 9 - LOOKING NORTH FROM THE CORNER OF BRIDGE ROAD AND THE PRINCES HIGHWAY

Description: This view is from the perspective of northbound motorists, pedestrians, and cyclists on approach to Nowra Bridge. The existing bridge can be seen in the background (Figure 88). Established vegetation of the southern foreshore can be seen on the left of view, giving visual queues of the approach to the bridge. Formal planting is seen in the foreground, indicating the town entry to Nowra from Bridge Road.

Sensitivity: This view is from the perspective of motorists, pedestrians, and cyclists travelling north. The view has been assessed to have a **moderate** sensitivity due to the attractive established vegetation on approach to the bridge in a gateway setting.

Magnitude: The proposed works would see the Princes Highway and Bridge Road intersection modified and realigned west to include the new northbound bridge. The existing northbound carriageway on the right of view would undergo lane adjustments to convert it to three lanes of southbound traffic. Northbound traffic would use the new northbound bridge. This would see the removal of almost all of the mature vegetation on the left of the photo. The existing southbound carriageway would be converted into a parkland character with a shared use path from the existing southbound bridge and feature planting near the roadside. These changes result in the magnitude being assessed as **high**.

Assessment of Impact: The combination of the sensitivity of the viewpoint and the magnitude of the proposal on the view provides an impact of **high-moderate**.

VIEWPOINT 10 - LOOKING NORTH ALONG THE PRINCES HIGHWAY

Description: This view is from the Princes Highway looking north along the highway corridor about 75 metres north of Moss Street (Figure 89). Established vegetation avenues are seen either side of the road. There is a footpath on the right of view, adjacent to the roadway.

Sensitivity: Northbound motorists would experience this view. Despite the attractive established vegetation on either side of the road, the sensitivity of the viewer is considered to be **moderate** due to their focus being on the road.

Magnitude: The proposed works would see the upgrading of the Princes Highway to provide three northbound and three southbound lanes to about 75 metres north of Moss Street, which is the general southern extent of the proposal. The widening of the road would result in the removal of the avenue of trees that run both sides of the Princes Highway, on the left and right of the photo. These changes result in the magnitude being assessed as **high**.

Assessment of Impact: The combination of the sensitivity of the viewpoint and the magnitude of the proposal on the view provides an impact of **high-moderate**.

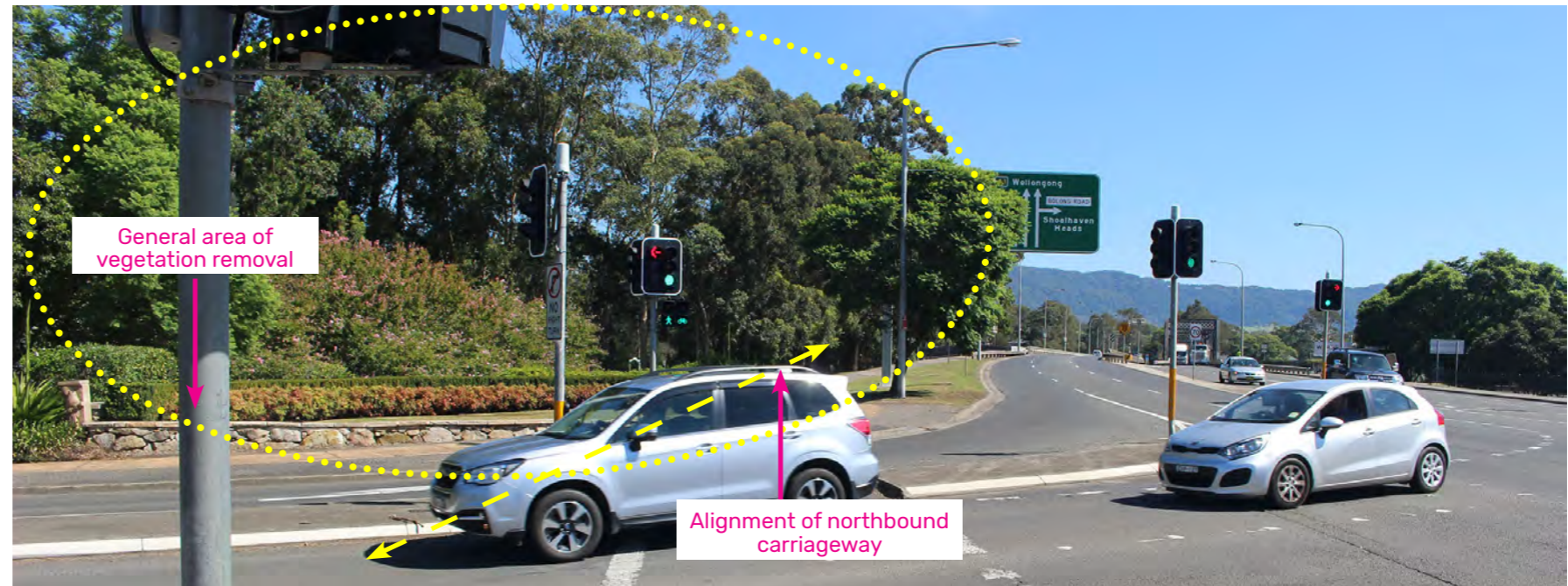


Figure 88. Viewpoint 9 looking north from the corner of Bridge Road and the Princes Highway



Figure 89. Viewpoint 10 looking north along the Princes Highway

5.4.3 VISUAL ASSESSMENT SUMMARY

Table 4. Summary of visual assessment table

| VIEW POINT | SENSITIVITY | MAGNITUDE | IMPACT |
|------------|-------------|-----------|-----------------|
| VPT 1 | Moderate | Moderate | Moderate |
| VPT 2 | Moderate | High | High - Moderate |
| VPT 3 | Moderate | High | High - Moderate |
| VPT 4 | High | High | High |
| VPT 5 | Moderate | Moderate | Moderate |
| VPT 6 | High | Moderate | High - Moderate |
| VPT 7 | High | Low | Moderate |
| VPT 8 | Moderate | High | High - Moderate |
| VPT 9 | Moderate | High | High - Moderate |
| VPT 10 | Moderate | High | High - Moderate |

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Chapter 6

MITIGATION STRATEGIES

6.1 INTRODUCTION

This section describes the mitigation measures that have been included as part of the concept design, described in Chapter 4 of this report and a summary of further safeguards and management measures directly related to the identified impacts which are to be incorporated in the detail design and construction phases of the project. They have been developed in accordance with the urban design and landscape objectives and principles, outlined in Chapter 3.

6.2 MITIGATION INCORPORATED IN THE CONCEPT DESIGN

The integration of the engineering and performance objectives with urban and landscape design objectives for the additional crossing of the Shoalhaven River at Nowra aims to produce a design outcome that fits sensitively with the existing qualities and characteristics of the area. In order to achieve this, a range of mitigation measures have been incorporated into the proposal as the concept has developed. These measures combine to develop a solution that seeks to protect and enhance the existing visual and landscape character of the Nowra area and the Shoalhaven River where possible.

The mitigation measures that have been undertaken during the development of the urban and landscape design concept are summarised below.

NEW NORTHBOUND BRIDGE

The following design measures have been undertaken during concept design to ensure that the new northbound bridge is designed to avoid where possible adverse visual and landscape character impacts:

- The horizontal and vertical alignment of the new northbound bridge has been designed as to avoid visual or landscape character impacts
- The new northbound bridge has been kept as low as possible over the Shoalhaven River while still allowing for the required navigation clearances
- The concrete box girder design for the new northbound bridge, which is preferred to the Super-T design, allows for a simple, streamlined and contemporary appearance that respects and retains the visual integrity of the existing bridge structures
- The visual bulk of the new northbound bridge is minimised by adopting a straight superstructure.

The following design measures have been undertaken to create a visually complementary relationship between the new northbound bridge and the existing bridge structures:

- The piers on the new northbound bridge are aligned with the piers on the existing southbound and northbound bridge structures as much as possible
- The exposed pile caps on the piers in the river have rounded ends in keeping the pile cap detailing on the existing northbound bridge.

NORTH NOWRA

- New tree planting would be provided along the Princes Highway between Bolong Road and Illaroo Road to compensate for tree loss due to the road widening works
- The proposed retaining wall north of Bolong Road would have a site specific finish to relate to the character of the surrounding landscape
- Feature tree planting would be provided along the Princes Highway between Bomaderry Creek Bridge and Nowra Bridge to indicate the approach to the bridge, as well as the Princes Highway and Illaroo Road intersection
- Areas where houses are to be removed would be grassed and stands of native trees planted to provide a park-like character to these areas
- Feature tree planting would also be provided to the edge of the proposed public open space at the corner of the Princes Highway and Illaroo Road
- Native tree and shrub planting would be provided to the southern side of Illaroo Road to replace the loss of vegetation in Rotary Park.

RIVER FORESHORE

- Revegetation of the foreshores would assist in integrating the proposed works on the foreshore with the surrounding landscape
- The foreshore area would be rehabilitated with suitable vegetation to reinstate the park like character of the existing foreshore.

NOWRA

- Proposed 'gateway' planting at the intersections of the Princes Highway and Bridge Road would be provided as visual landmarks and to enhance visual identity
- Proposed tree planting would be undertaken either side of the Princes Highway as well as in the central median, where possible, reducing the scale of the works over time as the tree planting matures. The proposed planting would consider motorist sightlines and frame views to the Cambewarra mountain ranges to the north. Tree planting within the medians would be restricted to maximum of two metres high
- Feature avenue tree planting is proposed along either side of the Princes Highway to reduce the visual dominance of the large expanse of asphalt at the southern gateway into Nowra town centre and to indicate the southern approach to the bridge
- Native avenue planting is proposed either side of the Princes Highway south of the Bridge Road intersection to reinstate the existing character of the area, and to provide shade for pedestrians and cyclists using the shared use path
- Consideration should be given to pedestrian access across the Princes Highway at the new section of Pleasant Way to connect the existing park on the western side of the highway with the proposed new park and residential areas on the eastern side of the highway.

GENERAL

- Improvements to pedestrian access have been achieved with the provision of proposed new and upgraded footpaths and shared use paths.

6.3 SAFEGUARDS AND MANAGEMENT MEASURES TO BE INCORPORATED INTO DETAIL DESIGN

Subject to the environmental approval of the project being granted, it is recognised that further work will be required to develop the final urban design and landscape plan for the proposal.

Whilst development of the concept design has attempted to mitigate the overall impact of the proposal, focussing on the major proposal components, their design and integration within the Shoalhaven River and Nowra setting, opportunities will arise during detail design to further refine the design of the proposal to produce enhanced urban design outcomes.

The urban design and bridge design objectives and principles outlined in Chapter 3, together with the urban design, landscape and bridge design concept included in Chapter 4, would be used to further guide the detailed design of key project elements of the new northbound bridge, approach roads and public domain areas.

Below is a summary of the key mitigation and management strategies that will be considered during the detail design phase of the project.

GENERAL

- Ongoing integrated project development in the detail design phase will follow RMS integrated project development processes, and will include urban designers (selected from the RMS Registered Contractors Scheme) as part of the project team.
- RMS Urban Design Policy (Beyond the Pavement) and RMS Urban Design Guidelines will be used to guide future design development of the project.
- The urban design objectives, principles and concept design strategy presented in the urban design report for the Environmental Assessment (REF, EIS) will form the basis for future design development and consultation with stakeholders.

NORTH NOWRA

Further design development will;

- Investigate introducing retaining walls either side of the Princes Highway between Bolong Road and Bomaderry Creek bridge. This would provide the opportunity to retain existing tree planting on both sides of the highway, improving the visual and pedestrian amenity and reducing the scale of the highway
- Consider the proposed drainage swale design and location to minimise cutting as well as provide additional space for planting near the corner of the Princes Highway and Illaroo Road
- Consider the proposed footpath alignment and stair design of the path beneath the bridge structures and in Rotary Park to better reflect its parkland setting
- Consider the alignment of the footpath next to the existing southbound bridge and Perfect Catch, in consultation with adjacent land owners, to avoid impact to existing trees
- Investigate the design of the entrance to Perfect Catch Seafoods & Takeaway to prioritise pedestrians and cyclists over vehicles and facilitate ease of travel.

NEW NORTHBOUND BRIDGE

Further design development will;

- Consider the proposed pier designs to strengthen the complementary relationship between the proposed bridge piers and the piers of the existing northbound and southbound bridges. In particular, it will consider tapering the piers at their long elevation
- Investigate opportunities to further streamline the appearance of the new northbound bridge, including aligning the edges of the piers with the outside faces of the girder.

NOWRA

Further design development will;

- Investigate introducing retaining walls to the new northbound bridge approach road to retain existing trees where possible and better integrate with the surrounding parkland landscape
- Consider introducing retaining walls on either side of the Princes Highway south of the Bridge Road intersection in place of proposed embankments, to retain where possible the existing mature vegetation.

6.4 MITIGATION DURING CONSTRUCTION

The following mitigation measures would be implemented during construction:

- Detailed design documentation and drawings will define the extent of all construction activity including temporary works, in order to protect the area during construction
- Construction facilities will be contained within the construction works zone boundary and occupy the minimum area practicable for their intended use
- Construction work sites and ancillary sites will be returned to at least their pre-construction state, unless otherwise detailed in the project design, once construction activities are complete or will be progressively remediated throughout the construction program where possible
- Existing trees to be retained within construction facilities areas will be identified, protected and maintained for the duration of the construction works
- Temporary lighting will be screened, diverted or minimised to avoid unnecessary light spill
- Material used for temporary land reclamation will be removed once construction activities are complete.

6.5 URBAN DESIGN OPPORTUNITIES TO BE FURTHER INVESTIGATED IN DETAIL DESIGN

- Consider further design work to integrate shared use access to the existing southbound heritage bridge in order to improve safe and efficient connections to the regional cycleway route from Nowra to Shoalhaven Heads and beyond
- Consider reducing the extent of the proposed construction boundary to reduce impacts on existing trees on the Princes Highway and Illaroo Road
- Further investigate opportunities to reduce the proposed project footprint throughout detailed design
- Further investigate opportunities to enhance the role of the location as the southern arrival point to Nowra.

Chapter 7

CONCLUSION

The Shoalhaven River and its flat river plain, topographically dominate the study area for the Additional Crossing of the Shoalhaven River at Nowra. Either side of the river sit the neighbourhoods of Nowra and North Nowra and Bomaderry, which consist of wide streets, laid out in a grid pattern. The neighbourhoods are connected across the river by a concrete bridge and a historic steel truss bridge, which is part of the identity of Nowra. Outside of the town centres are established and newly developing residential areas and industrial areas, generally concentrated around the regional road and rail corridors and surrounded by the agricultural areas that comprise the town's rural hinterland.

Understanding the built, natural and community character of Nowra and the characteristics of the existing southbound heritage bridge, analysing the impacts of a new crossing in this location and associated road upgrades can have, along with identifying opportunities for mitigation and public space improvements and articulating urban design objectives and principles, has been an integral part of the design process. An iterative, inter-disciplinary process has been adopted to produce:

- An integrated design that best fits in with its context, complements the existing historic Nowra Bridge, minimises the impacts and mitigates the impacts that are unavoidable
- A new northbound bridge design that is elegant and well considered in the whole, parts and detailed elements
- A proposed shared use path crossing of the river that is well connected into the existing pedestrian and bicycle network of the adjoining areas.

The proposal aims to supplement the existing bridge structures and in doing this, would introduce a number of new elements into the environment, as described in Chapter 4 of this Report, including:

- Construction of a new northbound bridge over the Shoalhaven River immediately upstream (west) of the existing bridge, comprising three northbound traffic lanes
- Construction of a new road to link the Princes Highway with Lyrebird Drive in Nowra
- Upgrades to the road network in Nowra, North Nowra and Bomaderry to connect the new northbound bridge to the existing road network
- Construction of a shared use path to provide connectivity between Nowra, North Nowra and Bomaderry, and the new northbound bridge
- Provision of two pedestrian crossings with lights in Nowra to improve safety for pedestrians crossing the Princes Highway and Bridge Road
- Construction of new pedestrian links to connect the river foreshore east and west of the bridge structures
- Provision of designated car park spaces on Illaroo Road, to maintain a similar number of existing car park spaces currently available
- Construction of a drainage swale in North Nowra to manage local runoff
- Public utilities adjustment
- Ancillary facilities required for the construction of the project, including some or all of the following: site compounds, precast facilities, and stockpile areas for materials and temporary storage of spoil and mulch.

The urban design and landscape objectives and principles, developed for the proposal, take into account the urban design and visual character of the study area, and also reflect its relationship with the surrounding riverfront and urban areas. The proposed urban design, new northbound bridge and landscape concepts have been developed to achieve an integrated outcome that helps fit the project as sensitively as possible into its context and to minimise the impacts of the project on the future character of the area, through the incorporation of a number of mitigation measures. The urban design will:

- Ensure attractive views into the broader landscape are maintained by planting in appropriate locations
- Incorporate materials and finishes for new road elements that are site appropriate. The proposed bridge abutments will tie into the existing bridge abutments to provide continuity to the bridge abutments
- Ensure that the existing southbound bridge retains its visual precedence. The new northbound bridge has been designed to be as unobtrusive as possible, aligning the bridge soffit and piers with that of the existing northbound bridge. This would allow the existing southbound bridge to retain its visual prominence
- Ensure there is a visually complementary relationship between the new northbound bridge and the existing bridge structures. The analysis of the two proposed bridge pier options has shown the incrementally launched option to be the preferable design. The superstructure as well as the pier form relate to the existing bridges as well as providing a preferable aesthetic
- Include a planting design intended to reduce the scale of the proposed road infrastructure by the provision of appropriate tree species along the Princes Highway
- Provide distinctive town entry points
- Provide screening of the road infrastructure to adjacent land uses through the use of native plant species
- Provide new pedestrian and cycle connections for the community.

Development of the proposal during a future detail design phase would consider further key mitigation strategies outlined in this report in order to further integrate this project into the neighbourhoods of Nowra, North Nowra, and Bomaderry.

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